Lockheed Martin Corporation
Corporate Environment, Safety & Health
West Coast Projects Office
2550 North Hollywood Way, 3rd Floor, Burbank, CA 91505-1055
Facsimile 818-847-0256 or 818-847-0170

LOCKHEED MARTIN

Via Federal Express
CAY0699/248
WBS# 48

June 17, 1999

Mr. Gerald J. Thibeault
Executive Officer
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Dear Mr. Thibeault:

Subject: Water Supply Contingency Plan
City of Loma Linda

Reference: Cleanup and Abatement Order No. 97-58

In compliance with the approved Water Supply Contingency Plan (dated September 30, 1996) and the Perchlorate Work Plan and Schedule (dated August 15, 1997), enclosed please find the Water Supply Contingency Plan for the City of Loma Linda (COLL) for your review. This document was prepared by HSI-GeoTrans for Lockheed Martin and is designed specifically to address water supply maintenance for the COLL.

Should you have any questions, comments, or requests, please contact Tom Blackman at (818) 847-0791 or John Rotert at (909) 778-6048.

Sincerely,

Carol A. Yuge

Carol A. Yuge

Enclosures

cc: See Attached Distribution List

Distribution:
cc: Kalyanpur Baliga, Department of Health Services (San Bernardino)
Kevin Mayer, US EPA (Region IX)
Greg Snyder, City of Loma Linda

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WATER SUPPLY CONTINGENCY PLAN
CITY OF LOMA LINDA

June 17, 1999

Prepared by:

HSI GeoTrans
3150 Bristol Street, Suite 500
Costa Mesa, California 92626

On behalf of:

Lockheed Martin Corporation
West Coast Project Office
2550 North Hollywood Way, 3rd Floor
Burbank, California 91505

Prepared for:

City of Loma Linda
Department of Public Works
25541 Barton Road
Loma Linda, California 92354

Roy J. Marroquin
Project Manager

James C. Norman, R.G. C.HG.
Project Director

WATER SUPPLY CONTINGENCY PLAN
CITY OF LOMA LINDA

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APPENDICES

1.0 INTRODUCTION

Lockheed Martin Corporation (Lockheed Martin) has been investigating the Crafton-Redlands Plume, a plume consisting primarily of trichloroethylene (TCE) located in the Bunker Hill Basin. As part of this effort, Lockheed Martin prepared a Water Supply Contingency Plan (dated September 30, 1996) to address maintenance of water supply to consumers in the event that municipal supply wells were adversely impacted by the plume. The September 30, 1996 plan was general in nature and described groundwater monitoring activities, responsibilities, and the decision-making process for selecting corrective actions. Lockheed Martin has also been investigating a perchlorate plume in the Bunker Hill Basin. In response to this plume, Lockheed Martin prepared a Perchlorate Work Plan and Schedule (dated August 15, 1997) to address the issue of perchlorate in the water supply contingency agreements with water purveyors.

In addition to the generic plans described above, Lockheed Martin is developing water supply contingency plans design individually for affected purveyors. The Plan presented in this document specifically addresses water supply maintenance for the City of Loma Linda (COLL).

The COLL currently, and for the planned future, obtains nearly all of its water from wells in the Bunker Hill Groundwater Basin. The main supply wells are the Richardson #1, #2, and #3 wells, and the Mountain View well #2. Analytical results of groundwater sampling conducted by Lockheed Martin indicate that TCE concentrations have historically been non-detect in the Richardson #1 and #3 wells. The TCE concentrations in the Richardson #2 and the Mountain View #2 wells have ranged from non-detect to considerably below the maximum contaminant level (MCL) of 5.0 micrograms per liter (µg/L).

Perchlorate concentrations in the Mountain View #2 and the Richardson #2 wells have recently ranged from lows of 5 µg/L to 8 µg/L to highs that exceed the provisional action level (PAL) of 18 µg/L. Perchlorate concentrations in Richardson #1 have ranged from non-detect to 12 µg/L. Perchlorate has not been detected in the Richardson #3 well. Previously existing production well Mountain View #1 experienced perchlorate concentrations consistently exceeding the PAL. As a result, Mountain View #1 well was deactivated in June 1998, and was abandoned on April 30, 1999.

A blending plan for continued use of the Mountain View #2 well was submitted to the State of California Department of Health Services (DHS) on October 22, 1998. The DHS conditionally approved the Mountain View #2 blending plan on October 23, 1998. The Mountain View #2 well is currently being operated under the conditions of the approved blending plan.

A blending plan for continued use of the Richardson #2 well was submitted to the DHS on April 5, 1999. The DHS conditionally approved the Richardson blending plan on May 18, 1999. Implementation of the approved blending plan is scheduled to begin in June 1999.

Trichloroethylene and perchlorate are expected to continue migrating westward through a portion of the COLL wellfield. Several of these wells, because of their position in the basin and the depth of their well screen intervals, will likely be affected by higher perchlorate and/or TCE concentrations in the future. This Water Supply Contingency Plan (WSCP) has been prepared to address maintenance of water supply to COLL consumers during periods in which the groundwater extracted by the COLL wells exceeds the MCL for TCE and/or the PAL for perchlorate.

This WSCP provides the following information: (1) a description of the COLL water supply and distribution system, (2) protocol and procedures for establishing well sampling frequency, (3) the long-term and near-term strategies to maintain water supplies, and (4) the approval process.

Since submittal of the September 30, 1996 WSCP document, Lockheed Martin has worked closely with the COLL to evaluate the water distribution system and water supply needs to develop a workable plan to address maintenance of water supply. The COLL and Lockheed Martin have reached several agreements addressing components of the WSCP. Agreements are provided in Appendix A and include: equipping Richardson #3 on an expedited schedule; water purchases from the City of San Bernardino; drilling of three test boreholes to aid in the selection of new production well sites, installation of new production wells to help the COLL meet long-term water demand, and installation of an in-line blender in the Richardson main pipeline as required by the DHS for the Richardson #2 blending plan. Lockheed Martin and the COLL are currently pursuing the establishment of connections with the City of Redlands and Loma Linda University water systems as components of the near-term water supply strategy. If successful, additional construction and water purchase agreements will result from this effort.

2.0 WATER SUPPLY AND DISTRIBUTION SYSTEM

The COLL Municipal Water System provides water to a population of approximately 21,300 persons through approximately 4,300 water service connections within a service area of 4.5 square miles. Based on information presented in the 1998 COLL Water Master Plan, prepared by Montgomery Watson, the 1996 Average Day Demand (ADD) for the COLL was 3,073 gallons per minute (gpm) or 4.4 million gallons per day (mgd) and the Maximum Day Demand (MDD) was 5,839 gpm (8.4 mgd). These demands were projected in the Water Master Plan to increase to an

ADD of 4,437 gpm (6.4 mgd) and a MDD of 8,430 gpm (12.2 mgd) by the year 2020.

Figure 1 presents a schematic diagram of the COLL water system. A map view of the COLL water system is provided on Figure 2. The COLL currently supplies its water demands from four water wells and two connections to the City of San Bernardino (COSB) water system. These wells and connections supply water directly or indirectly to seven pressure zones in the city. Three of the water wells pump directly into Pressure Zone 1 (Richardson #1 at approximately 1,000 gpm, Richardson #2 at approximately 1,950 gpm, and Richardson #3 at approximately 2,200 gpm). The remaining water well, Mountain View #2, pumps directly into Pressure Zone 2A at approximately 1,350 gpm. Water from Pressure Zone 2A also provides service to Pressure Zone 1A by flowing through several pressure-reducing valves.

Since the Mountain View #1 well ceased pumping in June 1998, due to perchlorate concentrations that exceeded the PAL, the lost production of approximately 975 gpm has been replaced on a short-term basis by the purchase of water from the COSB. The purchased water is supplied through an existing connection between the two systems at the Anderson Booster Station, which has a capacity of approximately 900 gpm. A second connection to the COSB system exists at the Richardson Booster Station, which has a capacity of approximately 2,000 gpm. The COLL has an agreement to purchase up to 3,900 gpm of treated water from the COSB. However, during periods of peak demand, inflows are limited to approximately 900 gpm, to maintain adequate pressure in the COSB system.

The Nicks well, which has a capacity of approximately 900 gpm, is used on an emergency short-term basis only. Historical records indicate that nitrate concentrations in this well rise with continued pumping, and exceed the MCL of 45 milligrams per liter (mg/L) after pumping between 6.5 and 7.0 million gallons. The Nicks well is designed to pump directly into Pressure Zone 1A.

Groundwater is delivered from the water wells and connections to the COLL system via two major pipelines. The Mountain View well is connected to a 20-inch diameter pipeline and the Richardson wells are connected to a 16-inch diameter pipeline. The pipelines run approximately 8 miles to several reservoirs located in the southern portion of the COLL. The 16-inch transmission pipeline is the main distribution line to the Pressure Zone 1 area of the city's distribution system.

Activities are currently in progress to provide additional water supply through the construction of new water wells and inter-system connections. Details concerning these activities are discussed in Section 4.0.

The COLL water system has six storage reservoirs with a total capacity of approximately 12.9 million gallons. Three of these reservoirs provide 9.0 million gallons of storage for the Pressure Zone 1 distribution system. The remaining three reservoirs are located to serve the four higher elevation (pressure) distribution zones. The newest reservoir (placed into service in May 1997) has an ultimate capacity of 8 million gallons; however, only 6 million gallons of storage capacity are currently available due to operational constraints. This reservoir is the City's primary storage and distribution location. The existing storage capacity, zone served, elevation, and approximate percentage of the City's water demand is summarized below.

Zone	Percent of City's Water Demand	Zone Elevation	Useable Capacity (MG)	No. of Zone Reservoirs
1	51	1315	9.0	3
1A	31	1377	0.0	0
2	7	1427	0.6	1
2A	9	1511	3.2	1
3	2	1454	0.1	1

In addition to the above, there are two very small hydropneumatic pressure zones in the system. The COLL owns and operates six booster pump stations that pump water from pressure Zones 1 and 1A into the higher-pressure zones.

3.0 WELL SAMPLING

The COLL supply wells are sampled for TCE and perchlorate based on criteria set out in the September 30, 1996, WSCP document and the Perchlorate Work Plan and Schedule dated August 15, 1997. The Nicks well is not being sampled on a regular basis because the well is located south of the TCE and perchlorate groundwater plumes. Currently, with the exception of Richardson #2, all of the other existing COLL wells (Richardson #1, Richardson #3, and Mountain View #2) are operating and are sampled at a minimum of once a month. Richardson #2 is not currently operating because analytical results indicate that perchlorate and dibromochloropropane (DBCP) concentrations have exceeded the PAL and MCL, respectively. A blending plan was approved by the DHS on May 18, 1999 for Richardson #2. Implementation of the approved blending plan is expected to begin in June 1999. When implemented, the Richardson #2 well will be sampled in accordance to the sampling requirements of the DHS-approved blending plan.

The sampling frequency decision matrices for perchlorate and TCE are provided as Figures 3 and 4, respectively. The TCE sampling decision matrix was developed as part of the September 30, 1996, WSCP and the perchlorate sampling decision matrix was developed as part of the Perchlorate Work Plan and Schedule dated

August 15, 1997. Sampling of the COLL wells has followed the protocol shown on the decision matrices.

For each sampling event, work is coordinated with COLL and detailed procedures are followed, including purging or operation of each well for at least one hour prior to the sampling event. The analyses include volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) Method 502.2 (this method includes TCE as one of the analytes) and perchlorate by EPA Method 300 modified.

3.1 Perchlorate Sampling

As shown on Figure 3, if the average perchlorate concentration in a well over a one-year period is less than 25 percent of the PAL, the well will be sampled once a quarter. If at any time a perchlorate sample result is greater than or equal to 75 percent of the PAL, a confirmation sample will be collected within 48 hours of receipt of results. If the perchlorate concentration is confirmed to be greater than or equal to 75 percent of the PAL, the well will be sampled twice a month. If after three months, the average perchlorate concentration is less than 75 percent of the PAL, the sampling frequency for that well will return to once a month. If the average perchlorate concentration over the three-month period is still greater than or equal to 75 percent of the PAL, the well will continue to be sampled twice a month. If at any time a perchlorate sample result exceeds the perchlorate PAL; two confirmation samples will be collected within 48 hours of receipt of results. If the perchlorate result is confirmed to be greater than the PAL, the COLL, the State of California Regional Water Quality Control Board (RWQCB), and the DHS will be notified.

If a well exceeds the perchlorate PAL, one of the water supply contingency options discussed in Section 4.0 of this WSCP will be implemented. If over a 6-month period, the average perchlorate concentration is less than 50 percent of the PAL, the water supply contingency action may be discontinued and operations returned to normal.

Using the procedures outlined above, COLL wells Richardson #1 and #3 are sampled once a month for perchlorate. The Richardson #2 well, when reactivated, will be sampled according to the requirements of the approved blending plan. Mountain View #2, which is currently operating under a blending plan, is sampled twice a month. Blend samples from the two primary transmission pipelines (Richardson and Mountain View at Lawton) are sampled for perchlorate according to the requirements of the respective blending plans.

3.2 TCE Sampling

The protocol for TCE sampling is shown on Figure 4. If analytical results exceed 2/5th of the MCL for TCE related to the Crafton-Redlands Plume, sampling will be increased to bi-weekly for three months. If the three-month average TCE concentration is less than 2/5th of the MCL, the sampling frequency will return to monthly. If the average TCE concentration over the three-month period is still greater than 2/5th of the MCL, the well will continue to be sampled bi-weekly. If after one year of sampling, the average TCE concentration is less than 1/5th of the MCL, the sampling frequency will be reduced to quarterly. If during quarterly sampling TCE is detected between 1/5th and 2/5th of the MCL, the sampling frequency will be increased to monthly.

If TCE is detected at or above the MCL, two confirmation samples will be collected within 48 hours of receipt of results. If the TCE result is confirmed to be above the MCL, Lockheed Martin will implement a water supply contingency option as discussed in Section 4.0. If the average TCE concentration is less than ½ of the MCL over a 6-month period, the water supply contingency option may be discontinued and operations returned to normal.

Currently, the COLL wells (Richardson #1, #2, #3, and Mountain View #2) and two primary transmission pipelines (Richardson and Mountain View at Lawton) are sampled once a month for TCE. Although, based on the above protocol, some of the wells could be sampled quarterly for TCE. Lockheed Martin has elected to continue to sample the COLL wells monthly for TCE to provide additional assurance that TCE is being carefully monitored.

4.0 WATER SUPPLY STRATEGY AND CONTINGENCIES

Currently, low levels of perchlorate in water cannot be treated. Because treatment of water from existing wells for perchlorate is not a viable option, Lockheed Martin has developed long-term and near-term strategies to maintain water supply for the COLL based on blending and the acquisition of new water sources.

4.1 Long-Term Water Supply Strategy

The long-term water supply strategy for the COLL involves the installation and equipping (pump and supporting infrastructure) of municipal water wells sited and screened to avoid production of perchlorate and/or TCE contaminated groundwater. The scope of the long-term water supply strategy includes the equipping of one existing well (Richardson #3) and the installation and equipping of three new wells (Mountain View #3, Mountain View #4, and Richardson #4).

4.1.1 Equipping Existing Well

The Richardson #3 well was installed by the COLL in 1993. This well remained unequipped until 1998 when Lockheed Martin installed a pump and supporting infrastructure. The position of this well in the basin (shown in Figure 5) and the depth of the screened intervals are such that Richardson #3 should avoid significant perchlorate and/or TCE contamination through the period of projected plume migration. Richardson #3 is currently contributing to the COLL water distribution system but is being operated manually. Procurement of a "Y2K" compliant supervisory control and data acquisition (SCADA) system by the COLL is in progress.

4.1.2 Installation and Equipping of New Wells

Lockheed Martin is in the process of installing and equipping three new municipal water wells for the COLL. The locations of these three new wells (designated as Mountain View #3, Mountain View #4 and Richardson #4) are shown in Figure 5. These well sites have been chosen based on lithologic, geophysical, and water quality data collected during the drilling of test boreholes and from other existing wells in the area. Each of these wells will draw groundwater from what has been referred to in United States Geological Survey literature as the "lower water bearing zone". It also has been referenced as Hydrostratigraphic Unit #6 in several reports prepared by or for Lockheed Martin. This lower water-bearing zone is projected to experience minimal effects from the TCE or perchlorate plumes during the period of plume migration.

The location for the Mountain View #3 well has been selected to be on COLL property on Cooley Street. This is the same city-owned site as the former Mountain View #1 well. The site is located on the south side of Cooley Street, approximately 800 feet west of the intersection of Cooley Street and Mountain View Avenue.

The Mountain View #4 site is planned to be located southwest of the intersection of Interstate-10 and Mountain View Avenue. A test boring was drilled on this site to evaluate the hydrostratigraphy and water quality. The results of the test boring indicate that this is a suitable location for the Mountain View #4 well. This site is considered tentative because it is on privately owned land. The COLL is currently attempting to acquire this property for the installation of the new well.

The Richardson #4 site is located on the north side of Gould Street approximately 400 feet west of Richardson Street. This site is also considered tentative because it is property owned by the COSB. A request

to the COSB for a transfer of the property to the COLL has been made and acquisition by COLL appears likely.

4.2 Near-Term Water Supply Strategy

The three new production wells, with specifically designed pumps, are due to come on line in the months of March, May and June 2000. The period of highest water demand in the COLL occurs during the months of June through September. Water production from the COLL system is currently compromised because: (1) the Mountain View #1 well has been abandoned due to perchlorate concentrations that exceeded the PAL; (2) the Nicks well produces water high in nitrate after a short period of pumping and currently is not being utilized; (3) the Richardson #3 well is being manually controlled which limits its use until the new SCADA system is installed; and (4) Mountain View #2 and Richardson #2 wells are operating under blending plan restrictions. Because of these system limitations and restrictions, a near-term strategy was developed to maximize existing resources and supplement the COLL water supply to maintain water supply for the upcoming high demand period in 1999. This strategy involves maximizing the use of existing wells which are currently operating under blending plans, utilizing existing water system connections and establishing new connections to adjacent water systems that have surplus production potential, and installing a temporary pump in Mountain View #3 (the first of the new wells to be installed) as early as possible.

4.2.1 Maximize Use Of Wells Operating Under Blending Plans

The Mountain View #2 well is currently being operated under a DHS-approved blending plan. A blending plan has also been approved by the DHS for Richardson #2 well, which is expected to be implemented in June 1999. Both of these wells have had perchlorate concentrations that exceed the PAL. A time-series attenuation test was conducted at Richardson #2 in February 1999. The purpose of the test was to evaluate the rate of perchlorate concentration reduction over the length of time the well was pumping. The Richardson #2 attenuation test results revealed that the perchlorate concentrations were greatest when the pump was first started and consistently declined to low concentrations (5 µg/L to 8 µg/L) after one day of pumping. An interpretation of the attenuation test results is provided in Appendix B. Because the attenuation test data shows perchlorate concentrations remain low the more consistently this well is pumped, the approved blending plan includes provisions for continuous operation of Richardson #2. During the early period of pumping from shutdown, when perchlorate concentrations may be above the PAL, water from Richardson #2 will be blended with water from perchlorate-free water sources.

4.2.2 Utilizing Connections to Adjacent Water Systems

Connections to the adjacent water distribution systems of the COSB, the City of Redlands (COR), and Loma Linda University (LLU) are being pursued as contingency water supply sources should the COLL system be unable to meet peak water demand on its own. Each of these connections and their current status is discussed below.

Connection to the City of San Bernardino Water System

Two connections currently exist through which water can be transferred from the COSB to COLL Pressure Zone 1. The Anderson Boosters pump water through one of these connections (approximately 900 gpm) and the Richardson Boosters pump water through the other connection (approximately 2,000 gpm). These boosters are not flow controlled. During periods of high water demand, investigations have indicated that only the Anderson Boosters may be operated and still maintain adequate pressure in the contributing COSB pressure zone. Therefore, during periods of high water demand, the COSB connection through the Richardson Boosters may not be available.

The COSB connection at the Anderson Booster is the only COSB connection which has been operationally tested and for which a water transfer agreement currently exists. Thus, for near-term planning purposes, it is assumed that a continuous flow of 900 gpm will be available through the Anderson Booster connection during the period of high demand.

Connection to Loma Linda University Water System

Another component of the near-term water supply strategy to meet COLL water demands this summer includes the flow of excess water from the LLU system through their common existing connection. Excess production by the LLU system during the summer months is estimated to be approximately 1,000 gpm.

As of the date of this WSCP, conceptual approval has been received from LLU to allow water transfers to the COLL. Wellhead water samples from the two LLU wells (Anderson #2 and Anderson #3) have been acquired and analyzed to determine if there is any water quality restrictions that would inhibit the transfer of water to the COLL system. The analytical results indicate that LLU well water meets all requirements for COLL use. Following DHS approval of the water transfer, a flow test of the connection and joined systems will be conducted. Development and approval of a water transfer

and systems operation agreement between the COLL and LLU will also be required.

Connection to the City of Redlands Water System

A former connection joining the COR water system to the COLL system is located adjacent to Mountain View Avenue between Interstate-10 Freeway and Redlands Blvd. This connection is currently severed and a portion of the connecting pipe has been removed. Reestablishment of this connection is a component of the near-term water supply strategy. A flow test of the COR side of the connection was conducted on April 21, 1999. Results of the flow test indicate that 1,000 gpm is obtainable from the COR system into the COLL Pressure Zone 1 without pumping.

As of the date of this WSCP, a detailed connection design and associated documents have been prepared and reviewed by the COLL. The connection design documents and the water transfer agreement (being drafted by the COLL), requires approval by the COLL and COR water departments and city councils prior to implementing this near-term strategy. It is currently planned that the COR connection will be available for COLL use by end of July 1999. Meeting this schedule will require aggressive efforts in obtaining approvals, finalizing agreements, and during bidding and construction.

4.2.3 Bring Mountain View #3 Well On-Line With Temporary Pump

Based on the current Mountain View #3 well installation schedule, the Mountain View #3 well equipped with the new specifically designed pump is scheduled to be on line in June 2000. Completion of the well construction and testing without the pump is scheduled for mid-July, 1999. A component of the near-term water supply strategy includes refurbishment of the existing COLL pump retrieved from the abandoned Mountain View #1 well, and the use of that pump on a temporary basis in the new Mountain View #3 well. It assumes that with the refurbished pump, the Mountain View #3 well will contribute approximately 1,000 gpm to the COLL water distribution system. It is anticipated that following pump installation, water quality testing, and DHS approval, the Mountain View #3 well with the refurbished pump will begin to provide water to the COLL water distribution system in August 1999. The Mountain View #3 well with the temporary pump will remain in service until early May 2000. At that time, the well will be shut down, the temporary pump will be removed, and the new permanent pump will be installed.

4.3 Near-Term Water Supply Contingencies

A summary of near-term water supply contingencies is presented on Table 1. Table 1 summarizes the estimated maximum rate of production that could be available during summer peak demand for each of the COLL wells considered based on unrestricted operation for the Richardson #1 and Richardson #3 wells and blending plan restrictions for the Mountain View #2 and Richardson #2 wells.

Also shown on Table 1 is the estimated available water supply to the COLL through connections with adjacent water distribution systems as described above in Section 4.2.2. These connections are considered contingency water supply sources in the event the Mountain View #2 well and/or the Richardson #2 well are removed from service prior to the new wells coming on line. As the perchlorate plume continues to migrate west, higher concentrations may move into the COLL well field area and affect the shallower wells. If this occurs, the Mountain View #2 and Richardson #2 wells may produce water that cannot be adequately blended down to meet the perchlorate concentration criteria established by the DHS. These two wells which are components of the COLL water supply system are at the greatest risk. Contingency water supplies for these wells are identified on Table 1 to provide water in the event that water from one or both of these wells is unavailable.

One base case scenario and three contingency scenarios have been developed and are presented on Table 1. The base case and contingency scenarios utilize different combinations of wells and connections for COLL water supply. Each scenario results in a different water supply estimate. These water supply estimates are compared with the Maximum Day Demand (MDD) on the COLL system, which has been estimated to be 6,350 gpm for the summer of 1999. Water supply excesses or shortfalls are identified and the total water supply is shown as a percentage of water demand. If this percentage is less than 100 then water supply is less than the MDD. In these scenarios, the storage potential in the COLL system in meeting peak demand was not included. However, the COLL reservoirs are capable of storing an adequate volume of water to provide one day of supply at the MDD. Therefore, the water supply estimates presented in Table 1 are conservative and can be increase substantially on a short-term basis if reservoir storage is utilized.

The Base Case describes the scenario when all existing COLL wells (without Nicks well) are pumping, and none of the connections are contributing water to the supply. The total production from the Base Case is 6,500 gpm, which is slightly greater than the MDD of 6,350 gpm. The Base Case does not include water contributions from the Mountain View #3 well with the temporary pump. As stated above, Mountain View #3 is not projected to be available until August 1999.

Contingency #1 describes the case when all existing COLL wells are pumping except Richardson #2, which has been shut down. The COSB and the LLU connections are activated to replace the lost production from Richardson #2. The total production from Contingency #1 is 6,450 gpm, which is slightly greater than the estimated MDD of 6,350 gpm. As in the Base Case, it is assumed that water contributions from Mountain View #3 are not available.

Contingency #2 describes the case when both Richardson #2 and Mountain View #2 have been shut down resulting in a combined production loss of 3,300 gpm. The COSB, the LLU, and the COR connections are activated providing an additional contribution of 2,900 gpm. The total production from Contingency #2 is 6,100 gpm, which results in a 250-gpm shortfall when compared to the estimated MDD of 6,350 gpm. Again, it is assumed that Mountain View #3 is not contributing water to the system. It is unlikely, but not impossible that both Richardson #2 and Mountain View #2 may be lost before Mountain View #3 comes online. For this reason there exists a possibility of a near-term water supply shortfall.

Contingency #3 is the same as Contingency #2 except that it is assumed that 1,000 gpm would be available from Mountain View #3. The total production from Contingency #3 is 7,100 gpm, which exceeds the estimated MDD of 6,350 gpm. It is important to note that if both Richardson #2 and Mountain View #2 were shut down, and the Mountain View #3 well was online, it would still require the estimated contributions from all three connections to meet the MDD.

5.0 APPROVAL

Lockheed Martin will meet with the COLL to review, revise and finalize this WSCP. Following finalization, Lockheed Martin will submit this WSCP to the RWQCB and DHS for approval and comment, pursuant to Section 5(iv) of the Water Supply Contingency Plan – Redlands Groundwater Plume (Lockheed Martin Corporation, September 30, 1996). Revisions to this WSCP will be required as work proceeds on components of the water supply strategy, and as subsequent agreements between the COLL and Lockheed Martin are developed.

6.0 REFERENCES

Camp, Dresser, & McKee, July 22, 1998, Letter to Mr. Brent Payne of Radian International.

"Crafton-Redlands Trichloroethylene Groundwater Plume, Water Supply Contingency Plan, for the Period of October 1996 through September 1998, Prepared by Lockheed Martin for the California Regional Water Quality Control Board Santa Ana Region", dated 30 September 1996.

"Perchlorate Work Plan and Schedule, Deliverable Report in Response to Cleanup and Abatement Order 97-58, Order Item 1", Prepared by Radian International LLC and HSI GeoTrans for Lockheed Martin Corporation, 15 August 1997.

"Operating Plan Loma Linda Water Department, Loma Linda, California", prepared by Spring Water Systems, 15 June 1995

"City of Loma Linda, CA, Water Master Plan" Final Report, prepared by Montgomery Watson, April 1998

"City of Loma Linda, Water Master Plan", prepared by C.G. Engineering January 1989.

TABLE

TABLE 1

CITY OF LOMA LINDA NEAR-TERM WATER SUPPLY CONTINGENCIES

Water Supply Sources	Estimated Production Capacity (gpm)	Base Case (gpm)	Contingency #1 (gpm)	Contingency #2 (gpm)	Contingency #3 (gpm)
Mountain View #2 Well	1,350	1,350	1,350	0	0
Mountain View #3 Well	1,000	0	0	0	1,000
Richardson #1 Well	1,000	1,000	1,000	1,000	1,000
Richardson #2 Well	1,950	1,950	0	0	0
Richardson #3 Well	2,200	2,200	2,200	2,200	2,200
City of San Bernardino Connection	900		900	900	900
Loma Linda University Connection	1,000		1,000	1,000	1,000
City of Redlands Connection	1,000		0	1,000	1,000
Total Supply (gpm)		6,500	6,450	6,100	7,100
Maximum Day Demand (gpm)		6,350	6,350	6,350	6,350
Net Excess or <Shortfall> (gpm)		150	100	<250>	750
Supply/Demand Percentage		102	101	96	112

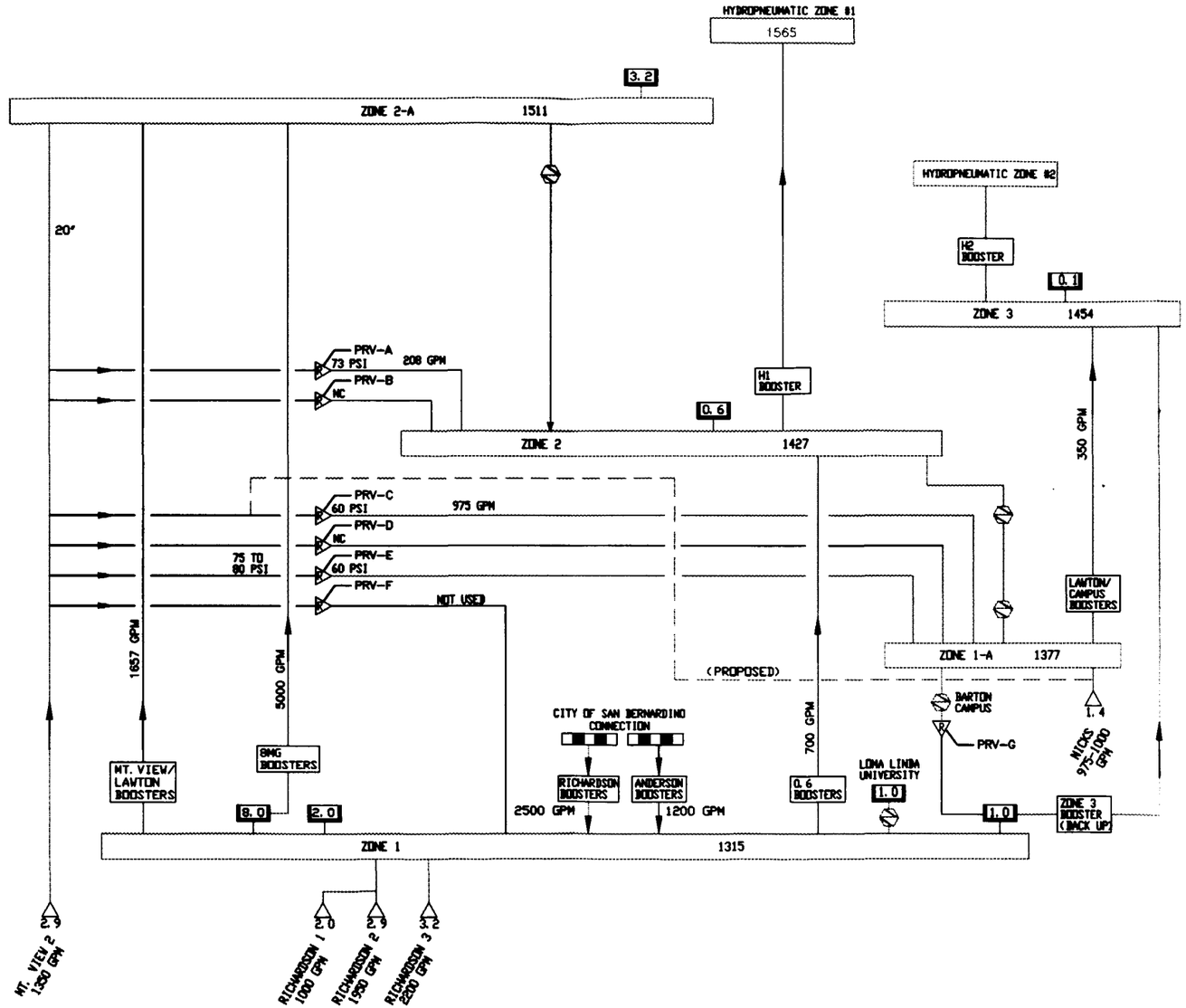
Base Case: All existing wells pumping, no contribution from connections, Mountain View #3 not yet online.

Contingency #1: All existing wells pumping except Richardson #2 which has been shut down, contributions from City of San Bernardino and Loma Linda University connections, Mountain View #3 is not yet online.

Contingency #2: Richardson #2 and Mountain View #2 have been shut down, contributions from all connections, Mountain View #3 not yet online

Contingency #3: Richardson #2 and Mountain View #2 have been shut down, contributions from all connections, Mountain View #3 is online.

FIGURES



EXPLANATION

- 1.5 — RESERVOIRS – CAPACITY IN MG
- BOOSTER PUMP – RATE IN MGD
- △ — WELL – RATE IN MGD
- NORMALLY CLOSED VALVE
- DIRECTION OF FLOW
- METROPOLITAN WATER DISTRIBUTION PIPELINE
- DISTRIBUTION ZONE
- PRESSURE REGULATOR
- NC NORMALLY CLOSED

M:\coll\col_wss.dwg

TITLE: City of Loma Linda Water System Schematic

LOCATION: LOCKHEED MARTIN LOMA LINDA, CALIFORNIA

HSI GEOTRANS A TETRA TECH COMPANY

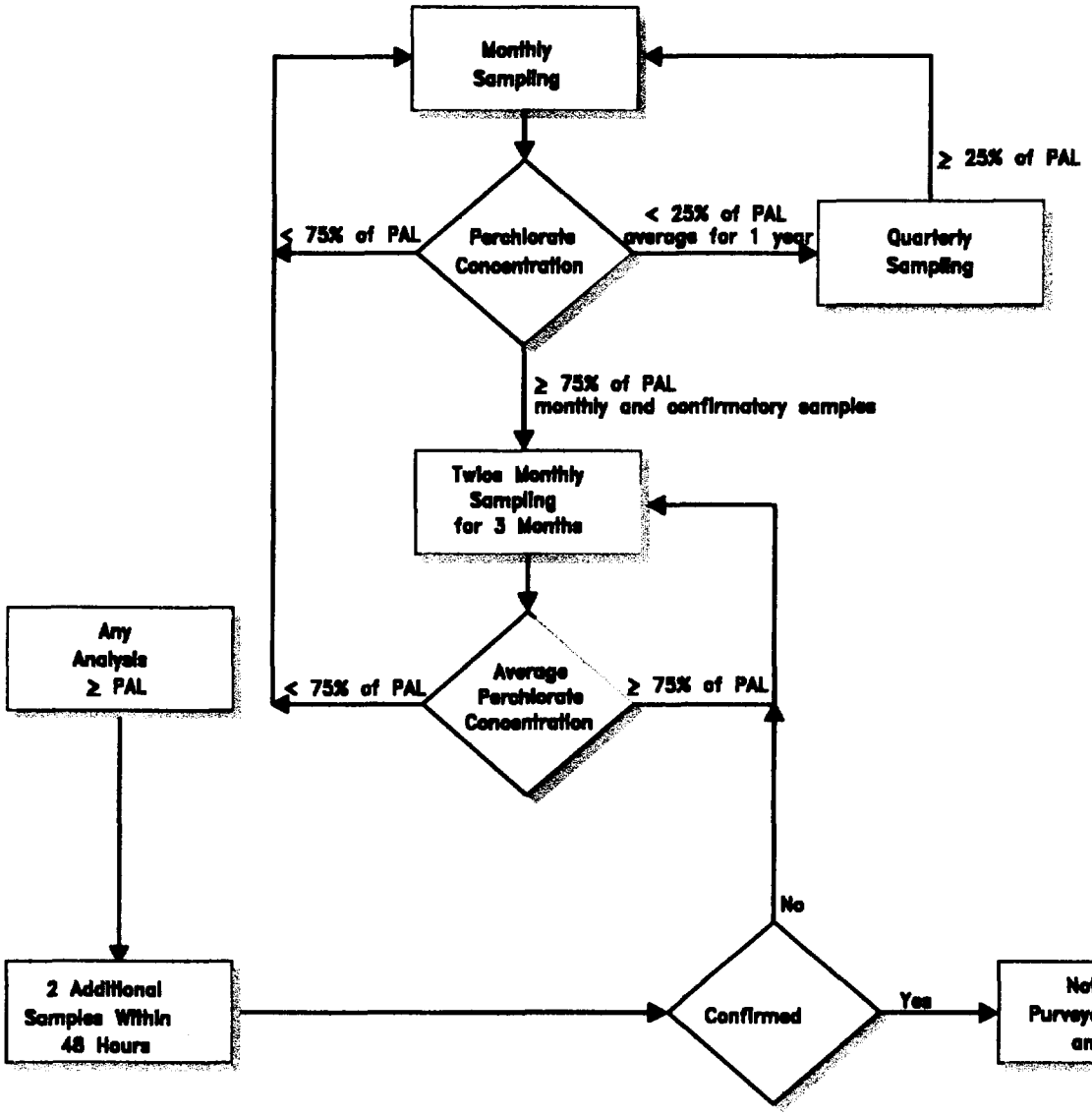
CHECKED:	Roy Marroquin
DRAFTED:	Hector Magaña
PROJ.:	C598-101
DATE:	05/08/99

FIGURE: 1

PARTIALLY SCANNED
OVERSIZE ITEM (S)

See Document # 66794
for partially scanned image(s).

For complete version of oversize document(s),
see paper copy.



Footnote:

Perchlorate Provisional Action Level (PAL) = 18 µg/L (California Department of Health Services, May 1997)

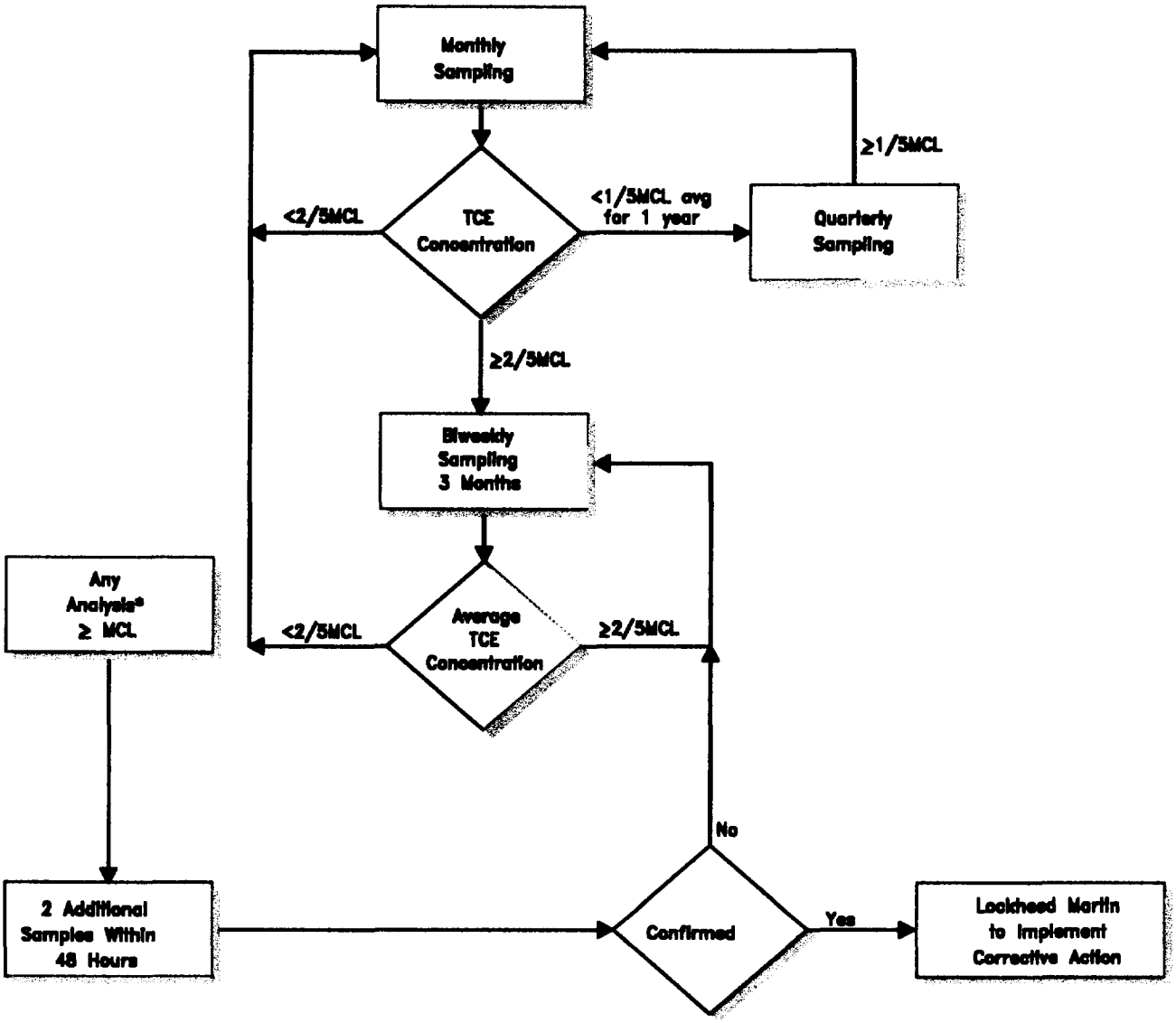
TITLE:	Decision Matrix for Sampling Production Wells for Perchlorate
LOCATION:	LOCKHEED MARTIN REDLANDS, CALIFORNIA

HSI GEOTRANS, A TETRA TECH COMPANY

CHECKED:	Ron Bruns
DRAFTED:	Hector Magaña
PROJ.:	C541-101
DATE:	09/25/98

FIGURE: 3

I:\lockheed\WSCP\dm0804a.dwg



Footnote:

* If, at a specific well, blending is occuring to provide acceptable water for compounds other than TCE, then no corrective action may be necessary as long as the concentration of TCE is less than 5.0 μg/L in the finished water.

TCE MCL = 5 μg/L (California Regulations, Title 22, Division 4, Chapter 15, Section 64444)

TITLE: Decision Matrix for Sampling of Production Wells for TCE from the Crafton-Redlands Plume

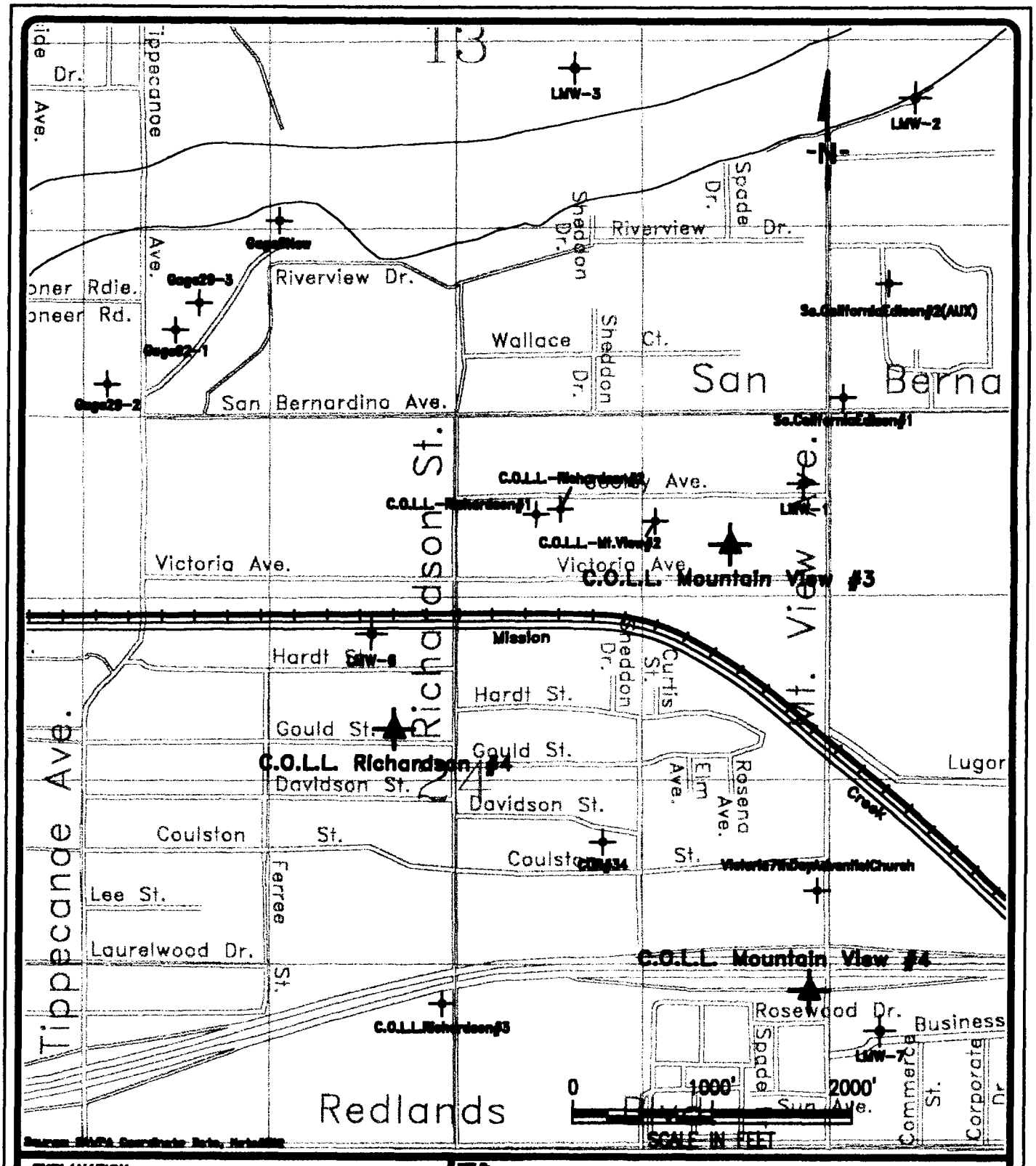
LOCATION: LOCKHEED MARTIN REDLANDS, CALIFORNIA

HSI GEOTRANS, A TETRA TECH COMPANY

CHECKED:	Ron Bruns
DRAFTED:	Hector Magaña
PROJ.:	C541-101
DATE:	09/25/98

FIGURE: 4

I:\lockheed\WBCP\dm-prod3.dwg



EXPLANATION

- New C.O.L.L. Well Locations
- LMW-1 Existing Lockheed Martin Monitoring Wells
- Existing Well Locations
- Railroad Track

M:\redlands\28141716\71c44-a.dwg

TITLE: **New City of Loma Linda Well Locations**

LOCATION: **LOCKHEED MARTIN REDLANDS, CALIFORNIA**

HSI GEOTRANS A TETRA TECH COMPANY

CHECKED:	Roy Marroquin
DRAFTED:	Hector Magaña
PROJ.:	C596-101
DATE:	05/13/99

FIGURE: 5

APPENDIX A

AGREEMENTS BETWEEN LOCKHEED MARTIN AND THE CITY OF LOMA LINDA

Lockheed Martin Corporation - Environment, Safety & Health
Burbank Program Office
2550 N. Hollywood Way, 3rd Floor Burbank, CA 91505-1055
Program Office, Regulatory Affairs, and
Remediation Demolition Departments: 818-847-0256 (Facsimile)
Business Office and Groundwater Department: 818-847-0170 (Facsimile)

LOCKHEED MARTIN

December 22, 1997
CAY1297/387
WBS 48720
Via Federal Express

Mr. Robert Clute
Director of Public Works
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

SUBJECT: WATER SUPPLY CONTINGENCY PLAN; RICHARDSON #3 WELL

Dear Mr. Clute:

This letter serves to confirm our understanding regarding work to be performed at the City of Loma Linda's water supply well Richardson No. 3. As you know, Lockheed Martin Corporation has been investigating a plume of trichloroethylene (TCE) and a plume of perchlorate in the Bunker Hill Basin pursuant to orders issued by the Regional Water Quality Control Board. Consistent with that effort, Lockheed Martin has prepared a Water Supply Contingency Plan, which the Regional Board approved with comments in March of 1997. The City and Lockheed Martin are currently engaged in discussions intended to lead to a Water Supply Contingency Agreement between the parties.

Consistent with the above, the City of Loma Linda now desires to perform certain work at well Richardson No. 3, as more particularly described below, and desires that Lockheed Martin reimburse it for that work. For its part, Lockheed Martin is amenable to the City's performing such work and agrees to reimburse the City, as more particularly described below. The parties, therefore, agree as follows:

The City agrees to install the following items at well Richardson No. 3: (1) a well pump, (2) a SCADA pump control system, (3) twenty linear feet of piping from the Well to the existing Richardson No.1 & No.2 transmission main pipeline, (4) disinfection equipment and an enclosure for that equipment, (5) appurtenant electrical equipment, (6) one hundred and fifty linear feet of ten foot wide access road from Richardson Street to the well site and site grading, (7) three hundred linear feet of block wall enclosure immediately around the well itself, and (8) a Variable Frequency Drive. The principal governing design drawings are incorporated by reference and are listed by title in Attachment 1. Please note that minor design changes continue to be in process, at the direction of the City of Loma Linda. Once available, the changes may be incorporated upon mutual agreement of the two parties to the agreement. The work of an independent inspector will also be part of the agreement as described in Attachment 2.

The City agrees to obtain competitive bids for the work described above. In addition to obtaining bids from companies of its own choosing, the City shall also solicit companies as suggested by Lockheed Martin. The City agrees to seek Lockheed Martin's concurrence on the selection of the contractor to perform the work and the contract price, to the extent permitted by state and local laws, regulations, and ordinances.

Lockheed Martin agrees to reimburse the City for the costs of performing the work described above within thirty (30) days of receipt of complete and detailed invoices for the performance of such work from the City, in a total amount not to exceed $453,000.00, including the City's Overhead of 14% of contract prices (For a breakdown of the cost estimate, please refer to the City's letter of December 17, 1997 in Attachment 3). Said reimbursement shall include progress payments contained in the agreement with the City's contractors. Progress payments shall be made within thirty (30) days of receipt of complete and detailed invoices for the performance of such work from the City.

Lockheed Martin accepts the City's proposal to share the energy efficiency rebate (if any) from Southern California Edison in 1998, per the terms of the City's letter dated December 16, 1997 (Attachment 4).

The City shall be responsible for the costs of operating and maintaining well Richardson No. 3 following its connection to the City's water distribution system.

The purpose of this agreement is to protect public health, partially fulfill the objectives of the Regional Water Quality Control Board, and promote the future settlement of certain outstanding claims between the parties. This Agreement is not an admission or acknowledgment in fact or law by Lockheed Martin that it is responsible for the plume of TCE contamination, or other contaminants of concern, in the Bunker Hill Basin or its potential adverse effects on public health or the environment. It is the intention of the parties that this agreement, which is not a final settlement, will be superseded by, incorporated into or otherwise made a part of the Water Supply Contingency Agreement currently being discussed by the parties.

Please note that this letter supersedes the November 12, 1997 offer letter on the topic of the Richardson #3 well. If you are in agreement with the above, please indicate by signing in the space provided below and returning one original to me. The second original is for your files. If you have any questions or comments, please call me at (818) 847-0107 or Mr. Tom Blackman at (818) 847-0791.

Sincerely,

Carol A. Yuge
Deputy Director
Burbank Program Office

Agreed to:

1/14/98

Mr. Robert Clute DATE
Director of Public Works
City of Loma Linda

Distribution List

cc: Robert Holub, Santa Ana Regional Water Quality Control Board
Eric Fraser, Department of Health Services

ATTACHMENT 1

City of Loma Linda Richardson (No. 3) Well Site
99% Design Review Construction Drawings and Specifications
by
Berryman & Henigar of San Diego
Designed by
Wain Cooper

12 Drawings Numbered 1 through 7 and E-1 through E-5:

Title Sheet
Site Plan
Grading Plan
Well Pump, Discharge Line and Storm Drain Plan and Sections
Richardson Well Site Details
Richardson Well Site Details
Richardson Well Site Details
Electrical Legend and One Line Diagram
Site Plan - Electrical
Electrical Details
Electrical Schedules and Details
Electrical Control Diagrams

NOTE: Minor Design Changes are in Process, at the Direction of the City of Loma Linda. Once available, the changes may be incorporated upon mutual agreement of the two parties to the agreement.

ATTACHMENT 2

Independent Inspector Estimate

John Egan and Associates, Inc. Letter Dated August 12, 1997 (File 900005.00) Attached

JOHN EGAN AND ASSOCIATES, INC.
CONSULTING ENGINEERS
25814 Business Center Dr., Suite A
Redlands, California 92374
Phone: (909) 889-0676 - Fax: (909) 796-7731

August 12, 1997

City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Attention: Mr. Robert Clute, Public Works Director

Subject: Richardson Well No. 3

File: 900005.00

Gentlemen:

In response to your request for construction services, we propose to conduct inspection and office engineering/coordination including preparation of pay estimates for the fixturization of Richardson Well No. 3. We estimate a maximum onsite and in-house effort of 1½-hours per day and a total construction time of 120 calendar days. Budgetary costs for the construction services would be $9,400. Of course, time would be spent on an "as needed" basis only, with charges in accordance with the enclosed Schedule of Fees.

We look forward to working with the City on this project. If there are any questions, or we can be of assistance, please contact the undersigned.

Very truly yours,

JOHN EGAN AND ASSOCIATES, INC.

John G. Egan, P.E.
President

JGE:ma

K:\Admin\900-005.00\richardson.jge.wpd/ma/aug97

ATTACHMENT 3

Summary of Revised Cost Estimate

Letter from Robert Clute of the City of Loma Linda to Thomas Blackman of Lockheed Martin, dated December 17, 1997 (Attached).

City Of Loma Linda

25541 Barton Road, Loma Linda, California 92354-3160 • (909) 799-2800 • FAX (909) 799-2890
Sister City — Manipal, Karnataka, India

Post-it® Fax Note 7671	Date 12/17	# of pages ▶ 6
To Tom Blackman	From Bob Clute	
Co./Dept. Lockheed Martin	Co. City of Loma Linda	
Phone #	Phone # 909-799-287	
Fax # 818-847-0256	Fax # 909 799-2891	

December 17, 1997

Thomas D. Blackman, R.G., C.HG.
Lockheed Martin Corporate Environment, Safety & Health
Burbank Program Office, 3rd Floor
2550 North Hollywood Way
Burbank, CA 91505-1055

Mr. Thomas Blackman:

Subject: Richardson Well #3

In further regard to the total well cost I wish to submit the recent quotations obtained by Gary Forth, Utility Supervisor. We discussed these figures at our meeting on December 15, 1997. In order to place everything into proper perspective I have used the compilation of Jim Shaw date 11/12/97. He compiled a cost estimate of $410,937 based upon a constant speed motor including $10,000 for a starter. To evaluate the cost of the VFD the quoted figure of $11,220 (General Pump) for a starter is used and $40,320 (Brithinee Electric) for the VFD. This is an additional $41,540 or a total Well Cost Estimate of $452,477.

We would therefore propose a well cost cap of $455,000 or $453,000 if you prefer. Lockheed would receive any potential Edison rebate as agreed to in my letter of December 16, 1997.

Sincerely,

R. Clute

Robert Clute
Interim Public Works Director

B. P. O.
DATE REC'D. 12/17/97
WBS # 48
COPIES TO: Blackman, Hodder, Yungen Helgerson, Hinton

Recycled paper

GENERAL PUMP COMPANY, INC.
159 NORTH ACACIA
SAN DIMAS, CALIFORNIA 91773
(909) 599-9606 / FAX: (909) 599-6238

ESTIMATE SHEET

JOB #

PREPARED BY: [signature]

CUSTOMER: Loma Linda LOCATION: DATE: 11/26

ATTENTION: Gary Forth TELEPHONE:

SUBJECT: Richardson Well 3

1	350 HP Variable Torque 460 Volt VFD			
	Mounted Nema 3R outdoor Enclosure			
	Circuit Breaker Disconnect			
	5% Line Reactor CPT Fan/Filters			
	Start / Stop Push botton			
	Run light w/ P.I.O.			
	Start-up Service & Training 8 hrs			41,670
	Shipment approx 4 weeks			
1	350 HP Soft Start 460 Volt			
	Nema 3R			
	Circuit Breaker w/ main Disconnect			
	and By-Pass Contactor			11220
	Shipment Approx 4 weeks			
	Applicable Tax and Freight is not included.			
1	350 HP USEM 460 V motor 1800 RPM			
	Inverter Duty			18400
	Standard Eff			14600
	Applicable Tax and Freight is not included			

BRITHINEE ELECTRIC

Phone 909-825-7971 Fax 909-825-6312
620 So. Rancho Ave, Colton, CA 92324

Refer to: Quote No. 1942

Gary Forth

Loma Linda, City of Public Services
25541 Barton Rd.
Loma Linda CA 92354

Date 11/20/97 Q2C [redacted]
Ph. No. 909-796-0131
Fax No. 909-825-3508
Freight Terms Allowed, Our truck delivery

Your contact at Brithinee Electric: Gregory Beebe

Description	Unit Price	Delivery	FOB
QUOTATION FOR A 350 HP VARIABLE FREQUENCY DRIVE, FOR RICHARDSON WELL #3.			
[1] Each of a Toshiba 350 HP VFD rated for 415 amps continuous on a variable torque load built-up in a 90 x 78 x 24 double-door free standing enclosure, suitable for outdoor duty.			
Custom VFD panel includes the following items: 1. Toshiba "G3" series VFD 2. 5% input line reactor			
3. VFD input contactor 4. 1000VA control power transformer with fusing 5. Fans & Filters ventilation with thermostat			
6. 600 amp thermal magnetic breaker with flange mount disconnect handle mechinism 7. 24VDC power supply rated for 1.2 amps			
8. Fuji "PYH" series PID controller 9. Door mounted VFD keypad 10. "START/STOP" push buttons			
11. VFD SPEED POTENTIOMETER 12. "RUN", "FAIL" pilot lights (push-to-test, transformer style) 13. AutoCAD 14 drawings			
14. All door mounted pilot devices are protected by a lockable, hinged window kit, rated for NEMA 4.			
15. One day of start-up service and training, during normal buiness hours.			
TOTAL NET PRICE	$40,320.00	6-8 WEEKS ARO	Colton, Ca

Sales Tax is additional if applicable. Prices good for 30 days, subject to change without notice.
Please Note: that this is not an offer to contract, but merely a quotation of current prices for your convenience and information. Orders based on this quotation are subject to our acceptance on the terms and conditions stated in our written Acknowledgment of order. We make no representations with respect to compliance with job specifications.

Comments

Price does not include installation. Others to provide a 4-20mA flow signal back to the VFD control panel.

BRITHINEE ELECTRIC

Phone 909-825-7971 Fax 909-825-6312
620 So. Rancho Ave, Colton, CA 92324

Refer to: Quote No 1936

GARY FORTH

Loma Linda, City of Public Services

25541 Barton Rd.
Loma Linda CA 92354

Date 11/18/97 Q2C
Ph. No. 909-796-0131
Fax No. 909-825-3508
Freight Terms TO BE ADDED

Your contact at Brithinee Electric: ROD SAMPLES

Description	Unit Price	Delivery	FOB
U.S. VHS MOTOR 350 HP, 1800 RPM, 460 VOLT INVERTER DUTY, PREMIUM EFFICIENCY, CLASS F INSULATION W/CLASS B RISE, 1.15 SF, 175% EHT, NRR, WP1 ENCL W/THERMOSTATS			
FRAME 449TP	$16,848.00	12-14 WEEKS	MENA, AK
FRAME 5006P	$16,372.00	"	"
SEE COMMENTS			
THANK YOU FOR THE OPPORTUNITY TO QUOTE			

Sales Tax is additional if applicable. Prices good for 30 days, subject to change without notice. Please Note: that this is not an offer to contract, but merely a quotation of current prices for your convenience and information. Orders based on this quotation are subject to our acceptance on the terms and conditions stated in our written Acknowledgment of order. We make no representations with respect to compliance with job specifications.

Comments

PER OUR PHONE CONVERSATION, YOU DID NOT KNOW THE REQUIRED THRUST CAPACITY OF THE MOTOR OR THE FRAME SIZE. I ASSUMED AT LEAST 175% EHT AND HAVE ENCLOSED PRICES FOR BOTH AVAILABLE FRAME SIZES. IF THE THRUST REQUIREMENT EXCEEDS 14000 LBS, PLEASE CONTACT ME FOR A REVISED QUOTE.

BRITHINEE ELECTRIC

Phone 909-825-7971 Fax 909-825-6312
620 So. Rancho Ave, Colton, CA 92324

Refer to: Quote No. 1946

Gary Forth

Loma Linda, City of Public Services
25541 Barton Rd.
Loma Linda CA 92354

Date 11/20/97 Q2C
Ph. No. 909-796-0131
Fax No. 909-825-3508
Freight Terms PPD & ADD

Your contact at Brithinee Electric: Gregory Beebe

Description	Unit Price	Delivery	FOB
QUOTATION FOR A 350 HP SOFT-STARTER, FOR RICHARDSON WELL #3.			
[1] Each of a FURNAS 350 HP, 480V, Soft-Starter with shunting contactor. NEMA 4 enclosure with circuit breaker, ETM, H-O-A selector switch, and Start push button.	$11,888.00	4-6 weeks ARO	Batavia, IL
Price does not include installation or any start-up service.			

Sales Tax is additional if applicable. Prices good for 30 days, subject to change without notice.
Please Note: that this is not an offer to contract, but merely a quotation of current prices for your convenience and information. Orders based on this quotation are subject to our acceptance on the terms and conditions stated in our written Acknowledgment of order. We make no representations with respect to compliance with job specifications.

Comments

City of Loma Linda Richardson #3 COST ESTIMATE (Constant Speed Motor Configuration)	
Well Construction Completion	$270,131
[includes chlorination, piping, valves, wall, paving, RTU, site electrical & swichboard (MCC)]	
Delete 400 linear feet of wall (Sponsored by City)	($28,925)
Sub-total	$241,206
Contractor OH&Profit (15%)	$36,181
Sub-total	$277,387
10% Contingency	$27,739
Sub-total	$305,126
Pump & Motor	$37,100
Starter (for Constant Speed Motor)	$10,000
Sub-total	$352,226
City Overhead (14%)	$49,312
Inspector (John Eagan)	$9,400
TOTAL (Cost Sponsored by Lockheed Martin)	$410,937

Prepared by Jim Shaw 11/12/97

ATTACHMENT 4

Justification of Purchase of Variable Frequency Drive and Offer to Share the Energy Efficiency Rebate (if any) from Southern California Edison in 1998

Letter from Robert Clute of the City of Loma Linda to Thomas Blackman of Lockheed Martin, dated December 16, 1997 (Attached).

Lockheed Martin Corporation - Environment, Safety & Health
Burbank Program Office
2550 N. Hollywood Way, 3rd Floor Burbank, CA 91505-1055
Program Office, Regulatory Affairs, and
Remediation Demolition Departments: 818-847-0256 (Facsimile)
Business Office and Groundwater Department: 818-847-0170 (Facsimile)

LOCKHEED MARTIN

VIA FEDERAL EXPRESS
CAY0598/156 WBS# 48

May 12, 1998

Mr. Robert Clute
Director of Public Works
City of Loma Linda
25541 Barton Road
Loma Linda, California 92354

Dear Mr. Clute:

Subject: **Project Invoicing**
Richardson Well #3 Equipment Retrofit

On May 6, 1998, Lockheed Martin Corporation (LMC) received a fax copy of the Brithinee Electric Invoice No. MR110582 that was directed to the City of Loma Linda (COLL). Per your May 12, 1998, telephone conversation with Mr. David Jones of Lockheed Martin Corporation (LMC) and per the December 22, 1997, Water Supply Contingency Plan (agreement), Lockheed Martin Corporation will pay progress payments within thirty (30) days of receipt of complete and detailed invoices. In support of this effort, LMC requests that COLL submit all invoices by way of letter written on COLL letterhead. Please include the following information in the letter:

1. Indicate in the letter that it is an "invoice".
2. Reference "Richardson #3" on the invoice.
3. Reference "CAY1297/387" (the agreement letter) on the invoice.
4. Include the total dollar amount being invoiced and include all appropriate back-up information (i.e. subcontractor invoices, etc.).

Thus, we ask that COLL resubmit the Brithinee Invoice No. MR110582 in the manner described above. LMC appreciates the cooperation of COLL on this important matter.

If you have any questions do not hesitate to contact me at (818) 847-0197 or Mr. David Jones, of my staff, at (818) 847-0295.

Sincerely,

Carol Yuge
Deputy Director

CAY:DLJ

cc: T. Blackman
D. Jones
S. Rosenberg
CAY Chron File
WBS File
Reg File

Lockheed Martin Corporation - Environment, Safety & Health
Burbank Program Office
2550 North Hollywood Way, 3rd Floor Burbank, CA 91505-1055
Facsimile 818-847-0256 or 818-847-0170

LOCKHEED MARTIN

Via Federal Express
CAY0698/163

June 23, 1998

Mr. Robert Clute
Director of Public Works
City of Loma Linda
25541 Barton Road
Loma Linda, California 92354

Re: Water Supply Contingency Plan; Purchase of Water

Dear Mr. Clute:

This letter serves to confirm our understanding regarding the potential purchase of drinking water from the City of San Bernardino. As you know, Lockheed Martin Corporation has been investigating a plume of trichloroethylene (TCE) and a plume of perchlorate in the Bunker Hill Basin pursuant to orders issued by the Regional Water Quality Control Board. Consistent with that effort, Lockheed Martin has prepared a Water Supply Contingency Plan, which the Regional Board approved with comments in March of 1997. The City and Lockheed Martin are currently engaged in discussions intended to lead to a Water Supply Contingency Agreement between the parties. The City and Lockheed Martin have previously entered into a letter agreement dated December 22, 1997, regarding Richardson No. 3 well.

Consistent with the above, the City of Loma Linda now desires to be able to purchase drinking water from the City of San Bernardino, as more particularly described below, and desires that Lockheed Martin reimburse it for purchased water. For its part, Lockheed Martin is amenable to reimbursing the City, as more particularly described below. The parties, therefore, agree as follows:

The Department of Health Services has established a provisional action level (PAL) of 18 parts per billion for perchlorate. The city will use their best efforts to blend water and distribute below the PAL. If the City cannot effectively blend the water it produces to meet the PAL for perchlorates, the City may purchase drinking water from the City of San Bernardino. The City agrees to minimize its purchase of water from the City of San Bernardino to the extent feasible. In particular, the City agrees to increase its production at water supply wells unimpacted by perchlorates, including at well Richardson No. 3, to the maximum extent feasible and to blend the water it produces in an effort to meet the PAL for perchlorates in purveyed water.

Lockheed Martin agrees to reimburse the City for the incremental cost of purchasing drinking water from the City of San Bernardino which the City must purchase in order to purvey drinking water that meets the PAL for perchlorates. The incremental cost of purchasing drinking water is the amount charged by the City of San Bernardino above the total cost typically incurred by the City to produce drinking water from its own water supply wells. The parties agree that for purposes of this letter agreement, the total cost typically incurred by the City to produce drinking water from its own wells is $ 0.32 per 100 cubic feet (CCF). Both LMC and City of Loma Linda agree to re-open discussion on the cost to purchase water should there be a substantial change in rates.

Lockheed Martin agrees to reimburse the City for the costs described above within thirty (30) days of receipt of detailed invoices for water purchased from the City of San Bernardino. Please send your detailed invoices to Mr. Steve Rosenberg at the Lockheed Martin Burbank Program Office.

The purpose of this agreement is to protect public health, partially fulfill the objectives of the Regional Water Quality Control Board, and promote the future settlement of certain outstanding claims between the parties. This Agreement is not an admission or acknowledgment in fact or law by Lockheed Martin that it is responsible for the plume of TCE contamination, or other contaminants of concern, in the Bunker Hill Basin or its potential adverse effects on public health or the environment. It is the intention of the parties that this agreement, which is not a final settlement, will be superseded by, incorporated into or otherwise made a part of the Water Supply Contingency Agreement currently being discussed by the parties.

If you are in agreement with the above, please indicate by signing in the space provided below and returning one original to me. The second original is for your files. If you have any questions or comments, please call me at (818) 847-0197 or Mr. Tom Blackman at (818) 847-0791.

Sincerely,

Carol A. Yuge
Deputy Director
Burbank Program Office

Agreed to:

7/8/98

Mr. Robert Clute — Date
Director of Public Works
City of Loma Linda

bcc:
T. Blackman
D. Hanket
J. Hemmans
E. Hodder
D. Jones
WBS 48
CAY Chron
Reg File

Lockheed Martin Corporation - Environment, Safety & Health
Burbank Program Office
2550 N. Hollywood Way, 3rd Floor Burbank, CA 91505-1055
Program Office, Regulatory Affairs and
Remediation Demolition Departments: 818-847-0256 (Facsimile)
Business Office and Groundwater Department: 818-847-0170 (Facsimile)

RECEIVED 06-17-98

LOCKHEED MARTIN

B. P. O.
DATE REC'D. 6/17/98
WBS # 48
COPIES TO: Ungo, Blackman, Herbert, Hemmer, Hobbs, Jones, Ray File

Via Federal Express
CAY0698/162

CITY OF LOMA LINDA
DEPARTMENT OF PUBLIC WORKS
JUN 15 1998
RECEIVED

June 11, 1998

Mr. Robert Clute
Director of Public Works
City of Loma Linda
25541 Barton Road
Loma Linda, California 92354

Re: Water Supply Contingency Plan; Mountain View #3 Well

Dear Mr. Clute:

This letter serves to confirm our understanding regarding work to be performed by the City of Loma Linda that may ultimately lead to the construction of a new water supply well denominated "Mountain View No. 3." As you know, Lockheed Martin Corporation has been investigating a plume of trichloroethylene (TCE) and a plume of perchlorate in the Bunker Hill Basin pursuant to orders issued by the Regional Water Quality Control Board. Consistent with that effort, Lockheed Martin has prepared a Water Supply Contingency Plan, which the Regional Board approved with comments in March of 1997. The City and Lockheed Martin are currently engaged in discussions intended to lead to a Water Supply Contingency Agreement between the parties. The City and Lockheed Martin have previously entered into a letter agreement dated December 22, 1997, regarding Richardson No. 3 well.

Consistent with the above, the City of Loma Linda now desires to perform certain work that may ultimately lead to the construction of a water supply well designated Mountain View No. 3, as more particularly described below, and desires that Lockheed Martin reimburse it for that work. For its part, Lockheed Martin is amenable to the City's performing such work and agrees to reimburse the City, as more particularly described below. The parties, therefore, agree as follows:

The City agrees to drill a borehole in the area depicted on the map shown in Attachment 1. The drilling specifications for the borehole are set forth in Attachment 2.

The City agrees to obtain competitive bids for the work described above. In addition to obtaining bids from companies of its own choosing, the City shall also solicit companies as suggested by Lockheed Martin. The City agrees to seek Lockheed Martin's concurrence on the selection of the contractor to perform the work and the contract price, to the extent permitted by state and local laws, regulations, and ordinances. Lockheed Martin agrees to provide assistance during the drilling of the borehole in the form of geological logging and geophysical interpretation of the borehole. Lockheed Martin will

advise the City of matters concerning the borehole activities; however, the City will be responsible for directing the selected contractor.

Lockheed Martin agrees to reimburse the City for the costs of performing the work described above within thirty (30) days of receipt of complete and detailed invoices for the performance of such work from the City, in a total amount not to exceed $50,958.00, including the City's Overhead of 14% of contract prices (see attachment 3 for cost breakdown). Said reimbursement shall include progress payments contained in the agreement with the City's contractors. Progress payments shall be made within thirty (30) days of receipt of complete and detailed invoices for the performance of such work from the City. Please send your invoices to Mr. Steve Rosenberg at Lockheed Martin Burbank Program Office. Please refer to this Agreement Number CAY0698/162 on your invoice.

The purpose of this agreement is to protect public health, partially fulfill the objectives of the Regional Water Quality Control Board, and promote the future settlement of certain outstanding claims between the parties. This Agreement is not an admission or acknowledgment in fact or law by Lockheed Martin that it is responsible for the plume of TCE contamination, or perchlorate contamination, or other contaminants of concern, in the Bunker Hill Basin or its potential adverse effects on public health or the environment. It is the intention of the parties that this agreement, which is not a final settlement, will be superseded by, incorporated into or otherwise made a part of the Water Supply Contingency Agreement currently being discussed by the parties.

If you are in agreement with the above, please indicate by signing in the space provided below and returning one original to me. The second original is for your files. If you have any questions or comments, please call me at (818) 847-0197 or Mr. Tom Blackman at (818) 847-0791.

Sincerely,

for

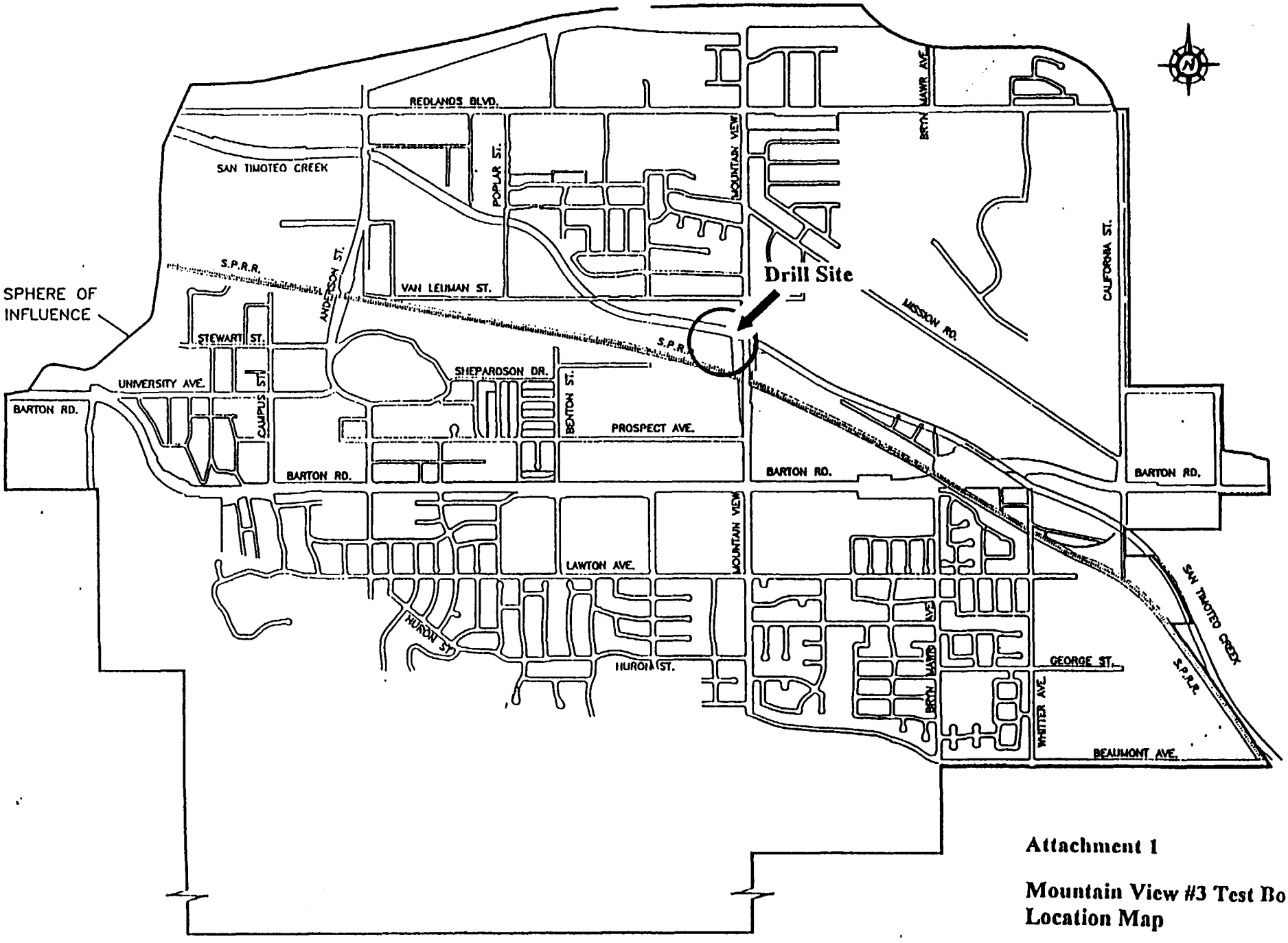
Carol A. Yuge
Deputy Director
Burbank Program Office

Attachments

Agreed to:

6/16/98

Mr. Robert Clute Date
Director of Public Works
City of Loma Linda



Attachment 1

Mountain View #3 Test Borehole Location Map

Attachment 2

Drilling Specifications

The scope of work for the test boring is outlined below.

- Obtain test boring (well permit) permit from County of San Bernardino Department of Health Services (DHS).

- Advance a test boring to a maximum depth of 1,100 feet below ground surface (bgs). The borehole shall be advanced by reverse-circulation mud-rotary methods. All drilling fluids shall be environmentally friendly and solvent-free. The minimum diameter should be large enough to accommodate construction of a 4-inch diameter temporary well per California Well Standards (i.e. nominal 8-inch diameter minimum).

- Upon reaching total depth, the test boring will be geophysically logged by a logging subcontractor using the following geophysical and profiling techniques; e-log (including SP, resistivity, and guard); gamma; and temperature.

- Following logging, the test boring will be partially abandoned with cement bentonite grout, or similar sealing material (per California Well Standards, Department of Water Resources as adopted by County of San Bernardino) to the temporary well depth of 800 feet bgs, and construct the temporary well.

- The depth of temporary well placement will be based on the geophysical log. However, for planning purposes it is assumed that the casing depth for the temporary well will be 800 feet bgs.

  The temporary well shall consist of 4-inch diameter mild steel casing with the lowermost 20-foot interval consisting of 60-slot perforated mild steel screen. The casing and screen should be suspended within the borehole during temporary well construction.

  Temporary well construction shall consist of emplacing a sand pack (No. 8/12 or equivalent) around the casing within the borehole annulus. The sand pack shall be emplaced using a tremie pipe to insure proper placement and to avoid sand bridging. The sand pack shall be positioned a minimum of 5 feet above and 5 feet below the perforated screen zone. Above the sand pack, 7 feet of fine-grained filter sand (no. 60 sand or equivalent) shall be emplaced, followed by a minimum of a 5-foot bentonite seal. The temporary well shall be allowed sufficient time to set after the placement of the bentonite seal and prior to development to avoid pumping bentonite into the screen.

- Development shall consist of surging, swabbing, airlifting, and pumping. Development shall be complete when a minimum of 10 casing volumes have been removed, the field parameters, including pH, temperature, conductivity, and turbidity are stable, and the turbidity is below 5 NTUs.

- At the conclusion of development a short constant-rate pump test will be performed. It is estimated that the duration of the pump test will be approximately 1 to 2 hours using a high yielding 4-inch diameter pump. Water level measurements will be obtained during pumping by the drilling contractor through a sounding pipe provided and installed by the drilling contractor. The contractor shall also provide an in-line flow meter to measure water discharge during pumping. It is anticipated that water will be collected and containerized on-site pending chemical analysis. The water will be discharged directly into the San Timeteo Wash, after receipt of acceptable analytical results, through hoses (assume 200 feet) provided by the drilling contractor.

- Upon completion of the constant-rate pump test, a water sample will be collected at the surface through a sample tap installed by the drilling contractor. The water sample shall then be provided to Client's representative.

- After the approximate 800-foot groundwater sample has been collected, another sample may be collected at an approximate depth of 550 feet in a different hydrostratigraphic unit to evaluate water quality and aquifer performance. If this depth is tested the 4-inch diameter temporary well will be removed and a tremie pipe will be lowered into the borehole and the test boring will be partially abandoned (per California Well Standards) from the interval of 800 feet bgs to 550 feet bgs. Upon borehole abandonment to 550 feet, the second temporary well string (if performed) shall be constructed. The same temporary well construction, development, testing, and sampling procedures described above shall be repeated for the 550-foot bgs interval.

- After collection of the final groundwater sample, the 4-inch diameter temporary well shall be removed and the balance of the borehole shall be abandoned in accordance with California Well Standards as adopted by County of San Bernardino.

In addition to the above outlined scope of work, the contractor shall provide (but not be limited to) the following materials, supplies, and services.

- All materials required to perform the outlined scope of work;

- Chip trays and core boxes for soil sample storage;

- Lighting for evening work, if required;

- Security, if needed by the contractor;

- Portable restroom facility;

Assumptions for Contractors bid.

- Site is accessible for work during day light hours (assume 6AM to 8PM);
- No overhead obstructions;
- Water is not available on site. The contractor shall provide all water needed for this project from a source outside of the City of Loma Linda. The water will be sampled by others prior to acceptance for drilling purposes.
- Development water shall be containerized on-site by the contractor pending chemical analysis. The water will then be discharged directly into San Timeteo Wash.
- Soil cuttings and residual mud shall be collected and containerized on-site by the contractor pending chemical analysis. The material shall be disposed of on-site pending acceptable chemical analysis results.

Attachment 3

Cost Breakdown
Mountain View #3 Test Borehole

Contractor Costs *

Reverse Circulation Drilling **	$27,780.00
Temporary Well Construction (800')	3,800.00
Geophysical Logging	2,900.00
Well Development	2,100.00
Borehole Abandonment	3,300.00
Import Water for Drilling ***	1,860.00
Frac Tank Rental (1)	1,160.00
Roll-off Bin Rental (2)	1,600.00
Chip Trays	200.00
Subtotal	$44,700.00
City of Loma Linda Fees (14%)	6,258.00
Grand Total	$50,958.00

* Costs are based on Water Development Corporation bid to City of Loma Linda.
** Drilling Costs include Mob/Demob, 1100' test hole and conductor casing.
*** Additional costs to import water from off-site as opposed to on-site source.

Lockheed Martin Corporation - Environment, Safety & Health
Burbank Program Office
2550 North Hollywood Way, 3rd Floor Burbank, CA 91505-1055
Facsimile 818-847-0256 or 818-847-0170

LOCKHEED MARTIN

VIA: Federal Express
CAY1198/251:WBS48

B. P. O.
DATE REC'D. 11/12/98
WBS # 48
COPIES TO: Hogue, Blackburn, Hamman, Holden, Jones

November 9, 1998

Mr. Bob Clute
Director of Public Works
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Subject: Water Supply Contingency Plan; Mountain View No. 1 Site Test boring Agreement

Dear Mr. Clute:

This letter serves to confirm our understanding regarding work to be performed by the City of Loma Linda that may ultimately lead to the construction of a new water supply well at the existing Mountain View #1 well site. As you know, Lockheed Martin Corporation has been investigating a plume of trichlorethylene (TCE) and a plume of perchlorate in the Bunker Hill Basin pursuant to orders issued by the Regional Water Quality Control Board. Consistent with that effort, Lockheed Martin has prepared a Water Supply Contingency Plan, which the Regional Board approved with comments in March 1997. The City and Lockheed Martin are currently engaged in discussions intended to lead to a Water Supply Contingency Agreement between the parties. The City and Lockheed Martin have previously entered into letter agreements regarding the Richardson No. 3 well and the test boring at Mountain View Avenue and San Timoteo Creek (letters dated December 22, 1997 and June 11, 1998 respectively).

Consistent with the above, the City of Loma Linda now desires to perform certain work that may ultimately lead to the construction of a water supply well on the property currently occupied by the City of Loma Linda's Mountain View No. 1 well, and desires that Lockheed Martin reimburse it for that work. For its part, Lockheed Martin is amenable to the City's performing such work and agrees to reimburse the City, as more particularly described below. The parties, therefore, agree as follows:

The City agrees to drill a borehole on the existing City of Loma Linda property currently occupied by the Mountain View No. 1 well. The drilling specifications for the borehole are set forth in Attachment 1.

The City agrees to utilize the contractor whom performed the test boring at the San Timoteo Creek location under the terms and rates established for that work. Lockheed Martin agrees to provide assistance during the drilling of the borehole in the form of geological logging and geophysical interpretation of the borehole. Lockheed Martin will advise the City of matters concerning the borehole activities; however, the City will be responsible for directing the selected contractor.

Lockheed Martin agrees to reimburse the City for the costs of performing the work described above within thirty (30) days of receipt of completed and detailed invoices for the performance of such work from the City, in a total amount not to exceed $86,868, including the City's Overhead of 14% of contract prices (see Attachment 2 for cost breakdown). Said reimbursement shall include progress payments contained in the agreement with the City's contractors. Progress payments shall be made within thirty (30) days of receipt of complete and detailed invoices for the performance of such work from the City. Please send your invoices to Mr. Steve Rosenberg at Lockheed martin West Coast Projects Office. Please refer to this Agreement Number CAY1198/251 on your invoice.

The purpose of this agreement is to protect public health, partially fulfill the objectives of the Regional Water Quality Control Board, and promote the future settlement of certain outstanding claims between the parties. This Agreement is not an admission or acknowledgment in fact or law by Lockheed Martin that it is responsible for the plume of TCE contamination, or perchlorate contamination, or other contaminants of concern, in the Bunker Hill Basin or its potential adverse effects on public health or the environment. It is the intention of the parties that this agreement, which in not a final settlement, will be superseded by, incorporated into or otherwise made a part of the Water Supply Contingency Agreement currently being discussed by the parties.

If you are in agreement with the above, please indicate by signing in the space provided below and returning one original to me. The second original is for your files. I f you have nay questions or comments, please call me at (818) 847-0197 or Mr. David L. Jones at (818) 847-0295.

Sincerely,

Carol Yuge
Director
West Coast Projects Office

Agreed to:

Robert Clute 11/10/98

Robert Clute Date
Director of Public Works
City of Loma Linda
Attachment

cc: T. Blackman (LMC)
G. Forth (COLL)
D. Jones (LMC)
R. Marroquinn (HSI)
G. Hamer (Radian)
CAY Chron File
WBS File
Reg File

Attachment 1
Drilling Specifications

This scope of work is similar to the initial test boring drilled at the San Timoteo site in July 1998. However, there are a few variations including total depth, noise abatement, and soil and waste handling. This test boring work is tentatively scheduled to begin in early November 1998 drilling crews.

The scope of work for the test boring is outlined below.

- Obtain test boring (well permits) permits from County of San Bernardino Department of Health Services (DHS).

- Establish and enforce a written site specific safety and health plan, in accordance with Title 8 CCR 5192, that addresses the safety and health hazards of each phase of site operations and includes the requirements and procedures for employee protection.

- Obtain water for drilling from an approved source (fire hydrant) and transport water to drill site. Water should be stored in a 22,000-gallon frac tank supplied by the driller.

- Furnish and install noise abatement structures at the drill site. Nominal 8-foot high sound barriers are acceptable.

- Advance the test boring to an anticipated total depth of 1,300 feet below ground surface (bgs). The actual depth may be deeper or shallower depending on site conditions. The borehole will be advanced using the reverse-circulation mud-rotary drilling method. The minimum diameter should be large enough to accommodate construction of a 4-inch diameter temporary well per California Well Standards (i.e. nominal 8-inch diameter minimum).

- Upon reaching total depth, the test boring will be geophysically logged by a logging subcontractor using the following geophysical and profiling techniques; e-log (including SP, resistivity, and guard); gamma; and temperature.

- Following logging, the test boring will be partially abandoned with cement bentonite grout, or similar sealing material (per California Well Standards, Department of Water Resources as adopted by County of San Bernardino) to the temporary well depth and construct the temporary well.

- The depth of temporary well(s) will be based on the geophysical log. However, for planning purposes it is assumed that the casing depth(s) for the temporary well(s) will be 1,300 and 1000 feet bgs.

  The temporary wells shall consist of 4-inch diameter mild steel casing with the lowermost 20-foot interval consisting of 60-slot perforated mild steel screen. The casing and screen should be suspended within the borehole during temporary well construction.

  Temporary well construction shall consist of emplacing a sand pack (No. 8/12 or equivalent) around the casing within the borehole annulus. The sand pack shall be emplaced using a tremie pipe to insure proper placement and to avoid sand bridging. The sand pack shall be positioned a minimum of 5 feet above and 5 feet below the perforated screen zone. Above the sand pack, 7 feet of fine-grained filter sand (No. 60 sand or equivalent) shall be emplaced, followed by a minimum of a 5-foot bentonite seal. The temporary well shall be allowed sufficient time to set after the placement of the bentonite seal and prior to development to avoid pumping bentonite into the screen.

- Development shall consist of surging, swabbing, airlifting, and pumping. Development shall be complete when a minimum of 10 casing volumes have been removed, the field parameters, including pH, temperature, conductivity, and turbidity are stable, and the turbidity is below 5 NTUs.

- At the conclusion of development a short constant-rate pump test will be performed. It is estimated that the duration of the pump test will be approximately 1 to 2 hours using a high yielding 4-inch diameter pump. Water level measurements will be obtained during pumping by the drilling contractor through a sounding pipe provided and installed by the drilling contractor. The contractor shall also provide an in-line flow meter to measure water discharge during pumping. Development water will be discharged into 22,000 gal. closed top frac tanks provided by the driller.

- Upon completion of the constant-rate pump test, a groundwater sample will be collected at the surface through a sample tap installed by the drilling contractor. The water sample shall then be provided to Client's representative.

- After the approximate 1,300-foot groundwater sample has been collected, another sample may be collected at an approximate depth of 1000 feet in the upper portion of the hydrostratigraphic unit to evaluate water quality and aquifer performance. If this depth is tested the 4-inch diameter temporary well will be removed and a tremie pipe will be lowered into the borehole and the test boring will be partially abandoned (per California Well Standards) from the interval of

1,300 feet bgs to 1000 feet bgs. Upon borehole abandonment to 1000 feet, the second temporary well string (if performed) shall be constructed. The same temporary well construction, development, testing, and sampling procedures described above shall be repeated for the 1000-foot bgs interval.

- After collection of the final groundwater sample, the 4-inch diameter temporary well shall be removed and the balance of the borehole shall be abandoned in accordance with California Well Standards as adopted by County of San Bernardino.

- Upon completion, development water in the frac tanks will be sampled and analyzed prior to discharge. Upon receipt of results and approval of the Client, the driller will discharge the water. It is anticipated that waste water will be discharged adjacent to the drill site through hoses (supplied by the driller) to a storm drain under an NPDES permit. If this is not possible, the waste water may require transport from the drill site by vacuum truck to an approved discharge point (assume 1 to 2 miles).

- Waste soil and mud will be stored at the drill site in 20 cubic yard soil bins. Upon completion of drilling, the waste soil and mud will be sampled and analyzed prior to disposal. It is anticipated that the waste soil and mud will be transported to COLL-owned property. The property is located approximately 1 mile south of the drill site at Mountain View Avenue and the San Timoteo Creek. This is the same location where waste soil and mud was disposed of in the initial test boring drilled in July 1998.

In addition to the above outlined scope of work, the contractor shall provide (but not be limited to) the following materials, supplies, and services. Associated costs, if any, should be included in your bid and listed on the attached bid sheets.

- All materials required to perform the outlined scope of work;

- Chip trays and core boxes for soil sample storage;

- Lighting for evening work, if required;

- Security, if needed by the contractor;

- Portable restroom facility;

Assumptions for Contractors bid.

- Site is accessible for work during day light hours (assume 6AM to 7PM);

- No overhead obstructions;
- Water and power are not available on site;

Attachment 2

Cost Breakdown

City of Loma Linda
Test Boring - Drilling Cost

Activity	Unit Cost	Number of Units	Cost
Noise Abatement	$8,500/Lump	1	$8,500
Mob/Demob	$4,200/Lump	1	$4,200
Drive Conductor Casing	$65/Ft	20	$1,300
Drill Test Hole	$22/Ft	1,280	$28,160
Borehole Abandonment	$3/Ft	1,300	$3,900
Geophysical Logging	$3,200/Lump	1	$3,200
Chip Trays	$230/Lump	1	$230
Temporary Well Construction Zone 1	$5,210/Lump	1	$5,210
Temporary Well Construction Zone 2	$4,460/Lump	1	$4,460
Temporary Well Development	$320/Hour	10	$3,200
Transport and Dispose of Waste Water	$3,960/Lump	1	$3,960
Transport and Dispose of Waste Water	$3,200/Lump	1	$3,200
Frac Tank Rental	$1,160/each	3	$3,480
Roll-off Bin Rental	$800/each	4	$3,200
SubTotal			$76,200
COLL Mark Up (14%)			$10,668
Drilling Total			$86,868

Lockheed Martin Corporation
Corporate Environment, Safety & Health
West Coast Projects Office
2550 North Hollywood Way, 3rd Floor, Burbank, CA 91505-1055
Facsimile 818-847-0256 or 818-847-0170

LOCKHEED MARTIN

FILE

VIA: Federal Express
CAY1298/278-WBS48

B. P. O.
DATE REC'D. 12/8/98
WBS # 48
COPIES TO: Yuen, Blackburn, Jones, Hammond, Hubbard, Roy

December 4, 1998

Mr. Bob Clute
Director of Public Works
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Subject: **Water Supply Contingency Plan; Off-ramp Site**
Test boring Agreement

Dear Mr. Clute:

This letter serves to confirm our understanding regarding work to be performed by the City of Loma Linda that may ultimately lead to the construction of a new water supply well at or in the vicinity of 10342 Mountain View Avenue in the City of Loma Linda, California ("Off-ramp Site) . As you know, Lockheed Martin Corporation has been investigating a plume of trichlorethylene (TCE) and a plume of perchlorate in the Bunker Hill Basin pursuant to orders issued by the Regional Water Quality Control Board. Consistent with that effort, Lockheed Martin has prepared a Water Supply Contingency Plan, which the Regional Board approved with comments in March 1997. The City and Lockheed Martin are currently engaged in discussions intended to lead to a Water Supply Contingency Agreement between the parties. The City and Lockheed Martin have previously entered into letter agreements regarding the Richardson No. 3 well, a test boring at Mountain View Avenue and San Timoteo Creek, and a test boring at the existing Mountain View #1 well site (letters dated December 22, 1997, June 11, 1998, and November 9, respectively).

Consistent with the above, the City of Loma Linda now desires to perform certain work that may ultimately lead to the construction of a water supply well on or in the vicinity of the Off-ramp Site, and desires that Lockheed Martin reimburse it for that work. For its part, Lockheed Martin is amenable to the City's performing such work and agrees to reimburse the City, as more particularly described below. The parties, therefore, agree as follows:

The City agrees to drill a borehole on the Off-ramp Site. The drilling specifications for the borehole are set forth in Attachment 1.

The City agrees to utilize the contractor whom performed the test boring at the San Timoteo Creek and Mountain View #1 locations under the terms and rates established for that work. Lockheed Martin agrees to provide assistance during the drilling of the borehole in the form of geological logging and geophysical interpretation of the borehole. Lockheed Martin will advise the City of matters concerning the borehole activities; however, the City will be responsible for directing the selected contractor.

Lockheed Martin agrees to reimburse the City for the costs of performing the work described above within thirty (30) days of receipt of completed and detailed invoices for the performance of such work from the City, in a total amount not to exceed $89,011 including the City's Overhead of 14% of contract prices (see Attachment 2 for cost breakdown). Said reimbursement shall include progress payments contained in the agreement with the City's contractors. Progress payments shall be made within thirty (30) days of receipt of complete and detailed invoices for the performance of such work from the City. Please send your invoices to Mr. Steve Rosenberg at Lockheed Martin West Coast Projects Office. Please refer to this Agreement Number CAY128/278 on your invoice.

The purpose of this agreement is to protect public health, partially fulfill the objectives of the Regional Water Quality Control Board, and promote the future settlement of certain outstanding claims between the parties. This Agreement is not an admission or acknowledgment in fact or law by Lockheed Martin that it is responsible for the plume of TCE contamination, or perchlorate contamination, or other contaminants of concern, in the Bunker Hill Basin or its potential adverse effects on public health or the environment. It is the intention of the parties that this agreement, which is not a final settlement, will be superseded by, incorporated into or otherwise made a part of the Water Supply Contingency Agreement currently being discussed by the parties.

If you are in agreement with the above, please indicate by signing in the space provided below and returning one original to me. The second original is for your files. If you have Any questions or comments, please call me at (818) 847-0197 or Mr. David L. Jones at (818) 847-0295.

Sincerely,

Carol Yuge
Director
West Coast Projects Office

Agreed to:

Robert Clute 12/7/98

Robert Clute Date
Director of Public Works
City of Loma Linda
Attachment

cc: K. Baliga (DHS)
T. Blackman (LMC)
G. Forth (COLL)
D. Jones (LMC)
R. Marroquinn (HSI)
K. Saremi (RWQCB)
CAY Chron File
WBS File
Reg File

Attachment 1
Drilling Specifications

This scope of work is the same as the scope of work specified for the test boring drilled at the Mountain View #1 site in November/December 1998. This test boring work is scheduled to begin in early December 1998.

The scope of work for the test boring is outlined below.

- Obtain test boring (well permits) permits from County of San Bernardino Department of Health Services (DHS).

- Establish and enforce a written site specific safety and health plan, in accordance with Title 8 CCR 5192, that addresses the safety and health hazards of each phase of site operations and includes the requirements and procedures for employee protection.

- Obtain water for drilling from an approved source (fire hydrant) and transport water to drill site. Water should be stored in a 22,000-gallon frac tank supplied by the driller.

- Furnish and install noise abatement structures at the drill site. Nominal 8-foot high sound barriers are acceptable.

- Advance the test boring to an anticipated total depth of 1,300 feet below ground surface (bgs). The actual depth may be deeper or shallower depending on site conditions. The borehole will be advanced using the reverse-circulation mud-rotary drilling method. The minimum diameter should be large enough to accommodate construction of a 4-inch diameter temporary well per California Well Standards (i.e. nominal 8-inch diameter minimum).

- Upon reaching total depth, the test boring will be geophysically logged by a logging subcontractor using the following geophysical and profiling techniques; e-log (including SP, resistivity, and guard); gamma; and temperature.

- Following logging, the test boring will be partially abandoned with cement bentonite grout, or similar sealing material (per California Well Standards, Department of Water Resources as adopted by County of San Bernardino) to the temporary well depth and construct the temporary well.

- The depth of temporary well(s) will be based on the geophysical log. However, for planning purposes it is assumed that the casing depth(s) for the temporary well(s) will be 1,300 and 1000 feet bgs.

The temporary wells shall consist of 4-inch diameter mild steel casing with the lowermost 20-foot interval consisting of 60-slot perforated mild steel screen. The casing and screen should be suspended within the borehole during temporary well construction.

Temporary well construction shall consist of emplacing a sand pack (No. 8/12 or equivalent) around the casing within the borehole annulus. The sand pack shall be emplaced using a tremie pipe to insure proper placement and to avoid sand bridging. The sand pack shall be positioned a minimum of 5 feet above and 5 feet below the perforated screen zone. Above the sand pack, 7 feet of fine-grained filter sand (No. 60 sand or equivalent) shall be emplaced, followed by a minimum of a 5-foot bentonite seal. The temporary well shall be allowed sufficient time to set after the placement of the bentonite seal and prior to development to avoid pumping bentonite into the screen.

- Development shall consist of surging, swabbing, airlifting, and pumping. Development shall be complete when a minimum of 10 casing volumes have been removed, the field parameters, including pH, temperature, conductivity, and turbidity are stable, and the turbidity is below 5 NTUs.

- At the conclusion of development a short constant-rate pump test will be performed. It is estimated that the duration of the pump test will be approximately 1 to 2 hours using a high yielding 4-inch diameter pump. Water level measurements will be obtained during pumping by the drilling contractor through a sounding pipe provided and installed by the drilling contractor. The contractor shall also provide an in-line flow meter to measure water discharge during pumping. Development water will be discharged into 22,000 gal. closed top frac tanks provided by the driller.

- Upon completion of the constant-rate pump test, a groundwater sample will be collected at the surface through a sample tap installed by the drilling contractor. The water sample shall then be provided to Client's representative.

- After the approximate 1,300-foot groundwater sample has been collected, another sample may be collected at an approximate depth of 1000 feet in the upper portion of the hydrostratigraphic unit to evaluate water quality and aquifer performance. If this depth is tested the 4-inch diameter temporary well will be removed and a tremie pipe will be lowered into the borehole and the test boring will be partially abandoned (per California Well Standards) from the interval of 1,300 feet bgs to 1000 feet bgs. Upon borehole abandonment to 1000 feet, the second temporary well string (if performed) shall be constructed. The same temporary well construction, development, testing, and sampling procedures described above shall be repeated for the 1000-foot bgs interval.

- After collection of the final groundwater sample, the 4-inch diameter temporary well shall be removed and the balance of the borehole shall be abandoned in

accordance with California Well Standards as adopted by County of San Bernardino.

- Upon completion, development water in the frac tanks will be sampled and analyzed prior to discharge. Upon receipt of results and approval of the Client, the driller will discharge the water. It is anticipated that waste water will be discharged adjacent to the drill site through hoses (supplied by the driller) to a storm drain under an NPDES permit. If this is not possible, the waste water may require transport from the drill site by vacuum truck to an approved discharge point (assume 1 to 2 miles).

- Waste soil and mud will be stored at the drill site in 20 cubic yard soil bins. Upon completion of drilling, the waste soil and mud will be sampled and analyzed prior to disposal. It is anticipated that the waste soil and mud will be transported to COLL-owned property. The property is located approximately 1 mile south of the drill site at Mountain View Avenue and the San Timoteo Creek. This is the same location where waste soil and mud was disposed of in the initial test boring drilled in July 1998.

In addition to the above outlined scope of work, the contractor shall provide (but not be limited to) the following materials, supplies, and services. Associated costs, if any, should be included in your bid and listed on the attached bid sheets.

- All materials required to perform the outlined scope of work;
- Chip trays and core boxes for soil sample storage;
- Lighting for evening work, if required;
- Security, if needed by the contractor;
- Portable restroom facility;

Assumptions for Contractors bid.

- Site is accessible for work during day light hours (assume 6AM to 7PM);
- No overhead obstructions;
- Water and power are not available on site;

Attachment 2

Cost Breakdown

City of Loma Linda
Test Boring #3 - Drilling Cost

Activity	Unit Cost	Number of Units	Cost
Transport and Water from Approved Source	$1,880/Lump	1	$1,880
Noise Abatement	$8,500/Lump	1	$8,500
Mob/Demob	$4,200/Lump	1	$4,200
Drive Conductor Casing	$65/Ft	20	$1,300
Drill Test Hole	$22/Ft	1,280	$28,160
Borehole Abandonment	$3/Ft	1,300	$3,900
Geophysical Logging	$3,200/Lump	1	$3,200
Chip Trays	$230/Lump	1	$230
Temporary Well Construction Zone 1	$5,210/Lump	1	$5,210
Temporary Well Construction Zone 2	$4,460/Lump	1	$4,460
Temporary Well Development	$320/Hour	10	$3,200
Transport and Dispose of Waste Water	$3,960/Lump	1	$3,960
Transport and Dispose of Waste Soil/Mud	$3,200/Lump	1	$3,200
Frac Tank Rental	$1,160/each	3	$3,480
Roll-off Bin Rental	$800/each	4	$3,200
SubTotal			$78,080
COLL Mark Up (14%)			$10,931
Drilling Total			$89,011

AGREEMENT

This Agreement is entered into by and between the City of Loma Linda ("City"), a California charter city, and Lockheed Martin Corporation ("Lockheed Martin"), a Maryland corporation, on the 13th day of April, 1999.

I. INTRODUCTION

A plume of dissolved trichloroethylene ("TCE") (the "TCE Plume") and a plume of perchlorate (the "Perchlorate Plume"), together comprising the "Crafton Redlands Plume", are situated in the groundwater in the Bunker Hill Basin of San Bernadino County, California. These Plumes contain concentrations of TCE above the federal and state safe-drinking water maximum contaminant level ("MCL") and concentrations of perchlorate above the state provisional action level for perchlorates.

The Plumes have migrated into the area where the City's active groundwater extraction wells are located. The City has operated four groundwater extraction wells (the Mountain View Nos. 1 and 2 and Richardson Nos. 1 and 2). The City extracts groundwater from these wells and purveys that water to its residents as drinking water.

The California Regional Water Quality Control Board, Santa Ana Region (" Board"), ordered that Lockheed Martin investigate the leading edge of the TCE Plume in Order No. 94-37, issued on April 22, 1994.

At the direction of the Regional Board, in a letter dated July 31, 1996, Lockheed Martin prepared a Water Supply Contingency Plan (the "Plan") dated September 30, 1996. The Board approved the Plan, with comments, on March 6, 1997. The purpose of the Plan is to ensure customers of purveyed water whose wells are affected by the TCE Plume a continued supply of drinking water that meets the federal and state safe drinking water MCL for TCE.

On July 25, 1997, the Board issued Order No. 97-58, requiring that Lockheed Martin develop and implement a remedial action plan for the Perchlorate Plume. While the Order is under appeal, Lockheed Martin is complying with Board directives under this order.

In letters to Lockheed Martin dated June 16, 1997, and October 31, 1997, the Board directed that Lockheed Martin address perchlorate in its negotiations of the water supply contingency plans with the water purveyors.

The City and Lockheed Martin have previously entered into letter agreements regarding the Richardson No. 3 well, a test boring at Mountain Avenue and San Timoteo Creek, the purchase of water, a test boring at the

existing Mountain View No. 1 well site, and a test boring at the Off Ramp Site (letters dated December 22, 1997, June 11, 1998, June 23, 1998, November 9, 1998, and December 4, 1998 respectively). These agreements and the present Agreement will form part of the Water Supply Contingency Plan Agreement between the parties.

The purpose of this Agreement is to protect public health, further the objective of completing a Water Supply Contingency Plan agreement, and promote the future settlement of any outstanding claims between the parties. Specifically, under this Agreement, Lockheed Martin agrees to design and construct up to three water supply wells for the City so as to maintain the pumping capacity of water production wells lost or forecasted to be lost by the City due to the migration of the Crafton Redlands Plume. This Agreement is not an admission or acknowledgement in fact or law by Lockheed Martin that it is responsible for the Plumes, or other contaminants of concern, in the Bunker Hill Basin. It is the intention of the parties that this Agreement, which is not a final settlement, will be superseded by, incorporated into or otherwise made a part of the Water Supply Contingency Agreement currently being discussed by the parties.

II. RESPONSE ACTIONS.

The following actions will be taken in response to the Crafton Redlands Plume.

A. Lockheed Martin shall cause up to three production wells (the "Wells") and appurtenant equipment (such as pumps, disinfection units, and security enclosures) to be constructed in a good and workmanlike manner in turnkey fashion ready for use by the City in its water supply system in accordance with the scope of work attached hereto as Exhibit "A" (the "Work"). Such Wells, pipes, and other appurtenant equipment constitute improvements to the City's water supply system and, as such, all right, title and interest in and to such improvements shall be vested in the City at the time of installation. Lockheed Martin shall provide to the City copies of all drawings, engineering specifications, as-builts and other pertinent information relating to the Well, which will become the property of the City. All guaranties or warranties relating to the design and construction of the Well shall be assigned to the City where possible. No other guaranties or warranties shall be provided or inferred.

To effect the purpose of this Agreement, Lockheed Martin agrees to cover the City's direct costs that it incurs in acquiring the Property to enable it to install and operate up to two of the production Wells at a particular location. Such costs shall include administrative costs and legal costs in negotiating the purchase agreement, recording the agreement, and paying the purchase amount.

Should the property owner's demand for compensation exceed reasonable standards, the City, after consultation with Lockheed Martin, agrees to either seek a new location for the Well or condemn the

Property. In the negotiations for purchase of the Property, the City agrees to provide Lockheed Martin the opportunity to participate and shall in any event keep Lockheed Martin apprised of the status and the ultimate price for the Property. Lockheed Martin agrees to cover the reasonable costs incurred by the City in either seeking a new location or condemning the Property.

If necessary, Lockheed Martin shall provide the necessary support services for the City to abandon up to three production wells identified as the Mountain View Numbers 1 and 2 wells and the Richardson Number 2 well upon mutual agreement of the parties. Prior to such abandonment, Lockheed Martin may install a blending apparatus for the Richardson wells to maintain utilization of these production wells upon mutual agreement of the parties.

Lockheed Martin shall cause all work to conform to all safety and health laws and regulations applicable to the construction or the wells and appurtenant equipment.

B. The City shall accept and use the Wells as part of its water delivery system upon successful completion of construction and issuance of the required permits for the Wells.

C. Lockheed Martin will reimburse the City for its administrative costs associated with the Work under this Agreement (excluding inspection costs addressed immediately below) in the amount of 6 percent of the contract price for completing the work. In addition, Lockheed Martin agrees to reimburse the City for reasonable inspection costs it incurs by employing the services of an outside contractor to oversee the Work under this Agreement not to exceed the amount of $60,000.00. The City shall submit to Lockheed Martin for review a budget estimate for inspecting the work at each well prior to commencing such activity.

D. Lockheed Martin shall reimburse the City for all necessary support services to prepare and submit all permit applications necessary to construct and operate the Well(s). Upon request by the City, Lockheed Martin shall draft all such permit applications for final review and approval by the City. The City shall be the named permittee on all such permits. The City and Lockheed Martin shall cooperate in obtaining all permits. If the City prepares the permit applications, it shall submit all such permit applications to Lockheed Martin for review and comment before submitting any such applications to appropriate governmental agencies.

E. The City shall be responsible for the proper operation and maintenance of the Wells and all costs associated therewith.

III. ACCESS.

A. The City hereby agrees to permit Lockheed Martin and its agents, employees and consultants to enter onto City Property more particularly described in Exhibit "B" (the "Property") from the date of this Agreement for the period of time which is reasonably required to complete the Work upon the terms and conditions contained in this Agreement.

B. Lockheed Martin shall have access to enter the Property to perform those tasks reasonably necessary to perform the Work described in this Agreement. Lockheed Martin shall not interfere with the City's normal business operations at its premises. The City and any lessees, licensees, or employees or agents of the City shall not prohibit, interfere with or obstruct the entry of Lockheed Martin, or its employees, agents, contractors, or subcontractors upon the Property.

C. Lockheed Martin shall have full responsibility for the storage and disposal of any soil cuttings and well development water and any other waste generated as a result of the Work in compliance with all federal, state, and local laws, rules and regulations, and shall be considered the generator of such waste materials for disposal purposes. Lockheed Martin does not accept any responsibility or admit any liability for the creation of or contribution to any threatened or actual condition of pollution or nuisance which may exist on the Property either prior to the performance of the Work or which is not directly caused by the performance of the Work.

D. To the full extent permitted by law, Lockheed Martin shall defend, indemnify and hold harmless City, its employees, agents and officials, from any liability, claims, suits, actions, arbitration proceedings, losses, expenses or costs of any kind, actual attorneys' fees incurred by City, court costs, interest, defense costs including expert witness fees and any other costs or expenses of any kind whatsoever without restriction or limitation incurred in relation to, as a consequence of or arising out of or attributable to the performance of this Agreement. All obligations under this provision are to be paid by Lockheed Martin as they are incurred by the City.

E. Lockheed Martin shall keep the Property free and clear of any mechanic's liens or materialman's lien arising out of the subject work.

IV. Insurance

A. Lockheed Martin shall maintain public liability insurance with the City as additional insured to protect Lockheed Martin and the City against loss from liability imposed by law, for damages on account of bodily

injury, including death resulting therefrom, suffered or alleged to have been suffered by any person or persons, other than employees, resulting directly or indirectly from the performance or execution of this Agreement or any subcontract thereunder, and also to protect Lockheed Martin and City against loss from liability imposed by law, for damage to any property, caused directly or indirectly by the performance and execution of this Agreement or of any subcontract thereunder. Said public liability and property damage insurance shall be maintained by Lockheed Martin in full force and effect during the entire period of performance under this Agreement in an amount of not less than One Million Dollars ($1,000,000) for bodily injury or death to any one person, and Three Million Dollars ($3,000,000) for bodily injury or death for any one accident or occurrence, and at least One Million Dollars ($1,000,000) for property damage, and shall name the City of Loma Linda as an additional insured party.

B. Lockheed Martin shall maintain adequate workmens' compensation insurance under the laws of the State of California for all labor employed by Lockheed Martin or by any subcontractor who may come within the protection of such workmen's compensation insurance laws.

V. Notices.

All notices or other communications under or in connection with this Agreement shall be in writing and shall be given by (a) personal delivery, (b) telephone facsimile, (c) overnight courier, or (d) regular mail. Such notices shall be addressed to the parties at the addresses set forth below:

Robert Clute

Director of Public Works
City of Loma Linda
25541 Barton Road
Loma Linda, CA 92354

Carol A, Yuge
Deputy Director
West Coast Projects Office
Corporate Environment, Safety & Health
Lockheed Martin Corporation
Suite 301
Burbank, CA 93021

VI. Procedure for Reimbursement.

For those costs that Lockheed Martin has agreed to pay pursuant to Section II above, Lockheed Martin shall reimburse the City within thirty days of receipt of complete and detailed invoices from the City. Invoices should be submitted no more frequently than on a monthly basis. The City should send its invoices to Carol A. Yuge, with the identifying Number CAY0499/149.

VII. Miscellaneous.

A. Applicable Law.

This Agreement, its validity, its construction and all rights hereunder, are governed by the laws of the State of California.

B. Modification.

This Agreement may not be modified except in writing, signed by both parties.

C. Binding Effect

This Agreement shall be binding upon and inure to the benefit of the parties' respective representatives, successors and assigns.

D. Severability

If any provision of this Agreement shall be adjudged invalid by any court, the remaining provisions of this Agreement shall remain valid and enforced to the full extent permitted by law.

E. No Third Party Beneficiaries

There are no third party beneficiaries of any kind to this Agreement.

F. Attorneys Fees

If any legal action or proceeding is brought to enforce or declare the rights and duties under this Agreement, the successful or prevailing party or parties shall be entitled to recover attorneys fees and other costs incurred in that action or proceeding, in addition to any other relief to which the parties may be entitled.

G. Cooperation.

The parties agree to cooperate with each other to accomplish the purposes of this Agreement, including exchanging data and information to assist Lockheed Martin in completing the Work under this Agreement.

IT IS SO AGREED.

Lockheed Martin Corporation

James H. O'Brien
Vice President, Corporate Environment, Safety & Health

The City of Loma Linda

Exhibit A

MOUNTAIN VIEW WATER SUPPLY PROJECT
SCOPE OF WORK

The purpose of this scope of work is to provide the City of Loma Linda (COLL) from one to three new municipal water wells capable of a sustained yield of between 1,500 and 2,500 gallons per minute each. These new wells will be installed as a response action under the Water Supply Contingency Plan. Also included in this scope of work is the abandonment of an existing COLL production well.

Project Location

The proposed COLL wells will be located in the south central portion of the Bunker Hill Basin, as shown on Exhibit B. A firm location for the first proposed well has been chosen on City of Loma Linda property at the existing Mountain View #1 well site. This site is located on the south side of Cooley Street, approximately 800 feet west of the intersection of Cooley Street and Mountain View Avenue. The two remaining wells shown on Exhibit B are tentatively located at this time. Tentative well site #1 is located southwest of the intersection of Interstate-10 and Mountain View Avenue. This site has been hydrologically validated by the results of a test borehole. However, this site is considered tentative because it is on privately owned land. The COLL is currently attempting to acquire this property for production well construction. Tentative well site #2 is located northwest of the intersection of Interstate-10 and Richardson Street. This site is on City of San Bernardino property but it appears that the COLL has access. This site is considered tentative because a test borehole is yet to be drill at this location.

Construction of New Well(s)

The construction of one to three new well(s) may include, but may not limited to, the following work:

Installation of Conductor Casing

The Contractor shall drill a nominal 42-inch diameter borehole using a bucket-auger drill rig, or if soil conditions are determined to be unstable, using a reverse circulation drilling method. The hole shall extend to a total depth of approximately 60 feet bgs or competent clay interval.

The conductor casing shall consist of a minimum of 36 inches in diameter with a wall thickness of not less than 5/16-inch. All joints shall be welded and water tight with field joints being either butt welded or collared.

After setting the conductor casing, the annular space between the borehole and the outer casing wall shall be filled with an appropriate grout material to form a sanitary seal (minimum 10-sack mix with ASTM C150 Type I or II Portland Cement). Concrete grout shall be left in place for a minimum of 24 hours prior to resuming drilling.

Pilot Borehole Drilling

The Contractor shall drill a nominal 17.5-inch diameter pilot borehole to the total depth of the final well (approximately 1,500 feet bgs). The pilot hole will be drilled using a flooded reverse circulation drilling method.

Only potable water from an approved source shall be used during drilling. The drilling fluid must be capable of sustaining the borehole during drilling and must be able to be removed from the formation and borehole during placement of the gravel pack and development of the well.

Drilling muds that are used during the program shall adhere to the American Petroleum Institute (API) standards, be free of any volatile organic compounds (VOCs). Any additives used in the drilling muds shall likewise be free of VOCs. Drilling mud will consist of a mixture of potable water and bentonite. If necessary, removable lost circulation materials (LCM) may be used, if necessary, and if approved in advance by the Owner.

Geophysical Logging

The Contractor shall provide services for the geophysical logging of the open pilot borehole. Geophysical logging will be performed to evaluate lithologic, stratigraphic, and hydrogeologic conditions, which will assist in final well design. The geophysical logging program includes the following:

- Spontaneous Potential (SP)
- Short and Long Normal Resistivity
- Single-Point Resistivity
- Guard Resistivity
- Natural Gamma Ray
- Deviation Survey
- Caliper

Zone Water Testing (Optional Item)

Aquifer zone testing may be conducted by the Contractor in areas of the borehole where a new well(s) may ultimately be perforated. The Contractor shall provide all labor, materials and equipment required to install temporary casing, gravel pack, seal,

and test pump equipment to depths specified by the Owner during the course of the program.

Pilot Borehole Reaming

The pilot borehole will be reamed from the base of the conductor casing (approximately 60 feet bgs) to the total depth (estimated 1,500 feet) of the proposed well. The reamed hole shall have a nominal diameter of 26 to 28 inches for a 16 and 18-inch diameter well and 29 to 30 inches for a 20-inch diameter well. Following completion of the borehole, a caliper survey will be performed.

Well Construction and Installation

The final well construction must be designed to provide a minimum sustained flow (capacity) of between 1,500 and 2,500 gpm. For the purpose of this scope of work, three well construction scenarios are proposed; a 16-inch diameter well capable of sustaining 1,500 gpm, an 18-inch diameter well capable of 2,000 gpm, and a 20-inch diameter well with a production capability of 2,500 gpm.

Casing and screen shall be installed in the borehole following completion and analysis of the pilot borehole. The placement and slot size of the well screens and the design of the gravel pack will be based lithologic and geophysical logs and on sieve analysis of drill returns. Centralizers must be installed on the casing and screen.

Gravel pack shall be installed using a temporary construction tremmie pipe beginning from the base of the borehole annulus.

A sanitary seal will be installed in compliance with the State of California Department of Water Resources (DWR) guidelines for community water-supply wells. The grout shall be emplaced using a temporary pipe extending from the zone to be grouted to the surface.

Well Alignment

Alignment of the borehole shall be tested using a probe with an outside diameter no less than 1-inch smaller than the inside diameter of the well casing and screen.

Well Development

Well development shall consist of several mechanical methods including swabbing, airlift development, pumping and or bailing.

Well Production Testing

Wells shall be tested for optimum rate of pumping through step drawdown and a constant rate discharge test. Production testing will not commence for a minimum of 12 hours following development, or until static water levels are achieved.

The wells will be step tested at rates of approximately ½, ¾, 1 and 1½ times the design capacity. Sand content of the discharge water shall be monitored at 3—minute intervals during the test.

After a 12-hour recovery period, the Contractor will perform a constant rate test by pumping the well at its full design capacity for not less than 48 hours or until otherwise instructed. Sand content will be monitored during testing.

Well Disinfection

Each newly completed well will disinfected. The disinfection shall be dry, granule 65% HTH calcium hypochlorite or similar product. Chlorine will be surged in the well for a minimum of 2 hours, allowed to stand for 12 hours and then flushed to clear the well of residual chemical.

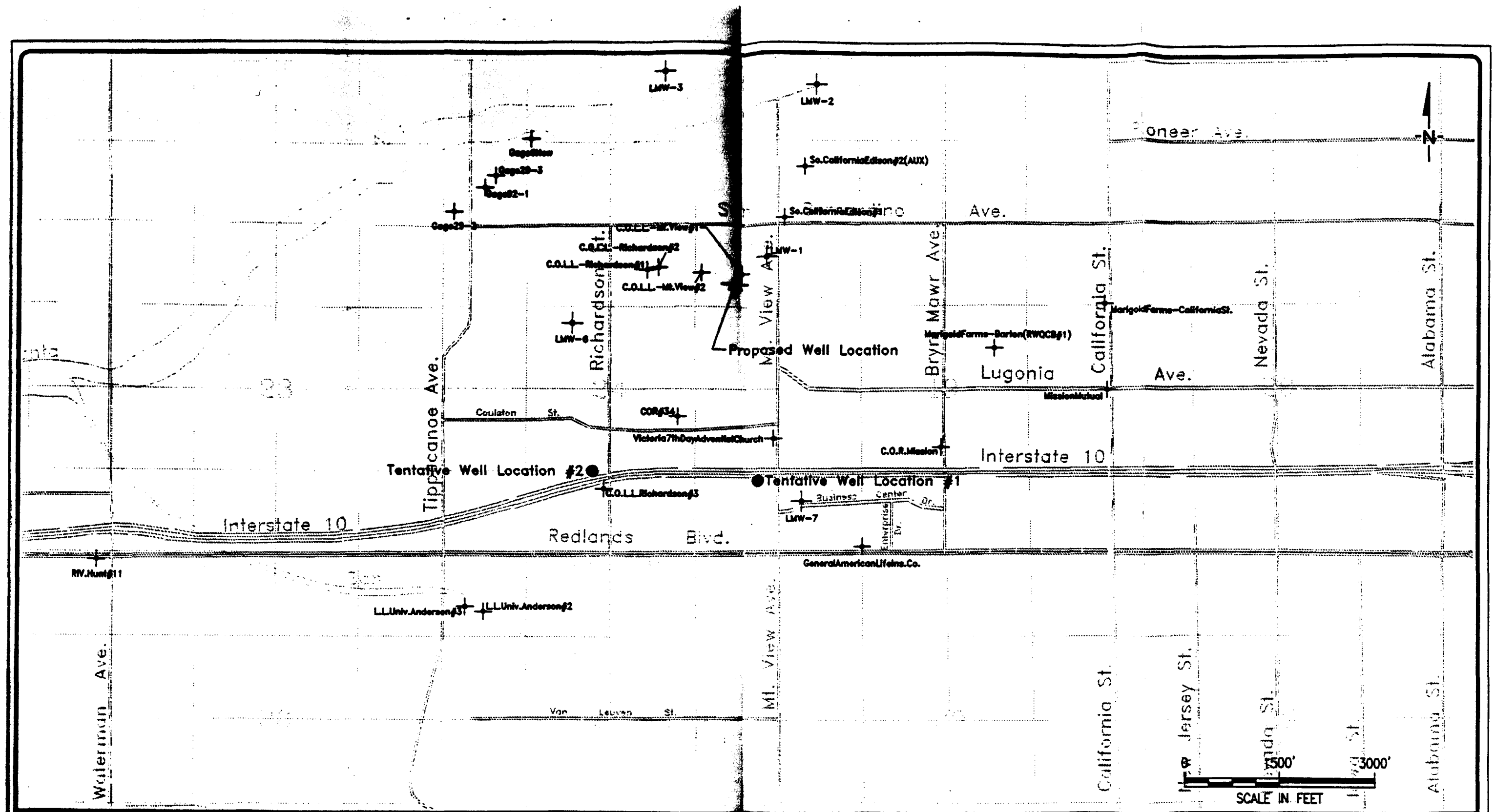
Pump Installation

The pump currently in existing Mountain View #1 well will be removed and refurbished when from Mountain View #1 well is abandoned as part of this field program (described below). This pump will be refurbished and temporarily installed in the replacement well so the well may be used. A permanent pump specifically designed for the replacement well will be designed, ordered, and installed.

Abandonment of Mountain View #1 Well

Prior to the completion of drilling, construction, and development activities of the new well, the existing Mountain View #1 well located approximately 50 feet north of the new well will be abandoned as part of this program. The well will be abandoned in accordance to DWR guidelines.

All wellhead structures will be removed. The wellhead materials will be stored for refurbishment and future use in the new well.



EXPLANATION

- Cage29-2 — Existing Well Locations
- LMW-1 — Existing Lockheed Martin Monitoring Wells
- Tentative C.O.L.L. Well Location
- Proposed C.O.L.L. Well Location

M:\redlands\2914171a\71a01-b.dwg Source: SAMPA Coordinate Data, April 1999

TITLE: Proposed and Tentative C.O.L.L. Well Locations

LOCATION: LOCKHEED MARTIN REDLANDS, CALIFORNIA

HSI GEOTRANS A TETRA TECH COMPANY

CHECKED:	Jim Norman
DRAFTED:	Hector Magaña
PROJ.:	N964-101
DATE:	04/01/99

EXHIBIT B

APPENDIX B

INTERPRETATION OF CITY OF LOMA LINDA RICHARDSON #2 ATTENUATION TEST DATA

APPENDIX B

INTERPRETATION OF CITY OF LOMA LINDA RICHARDSON #2 ATTENUATION TEST DATA

Since 1994, Lockheed Martin has been investigating hydrogeologic conditions within the Bunker Hill Basin. This investigation has primarily focused on the leading portion of the plumes in that area of the basin called the "pressure zone". Six hydrostratigraphic units (HSUs) were identified within the "pressure zone" and are characterized as alternating aquitards and aquifers. Beginning from the ground surface, HSU-1, HSU-3 and HSU-5 possess aquitard characteristics; and HSU-2, HSU-4 and HSU-6 possess aquifer characteristics. Figure B-1 provides a simplified representation of these hydrostratigraphic units and the depths at which they are encountered in the vicinity of Richardson #1 and #2 production wells.

As a result of sampling pre-existing wells and new monitoring wells, perchlorate has been found in HSUs- 2, 3 and 4. The perchlorate impacts on some City of Loma Linda production wells is a result of HSU-4 perchlorate contamination in that area.

Richardson #2 production well is one of the wells that have experienced perchlorate concentrations above the provisional action level (PAL) of 18 μg/L. Perchlorate concentrations in this well have ranged from approximately 6 to 46 μg/L in recent months. As a result, this well has not been allowed to pump regularly to the COLL system. In order to understand the changes in perchlorate concentrations with pumping, a four-day attenuation test was conducted on Richardson #2. The results of the attenuation test are shown in Figure B-2. The initial perchlorate concentration at startup was 46 μg/L, and after 2 hours of pumping, the perchlorate concentration fell to 16 μg/L (below the PAL). Within the second day of pumping, the perchlorate concentration fell to approximately 5 to 7 μg/L where it remained for the balance of the four-day test.

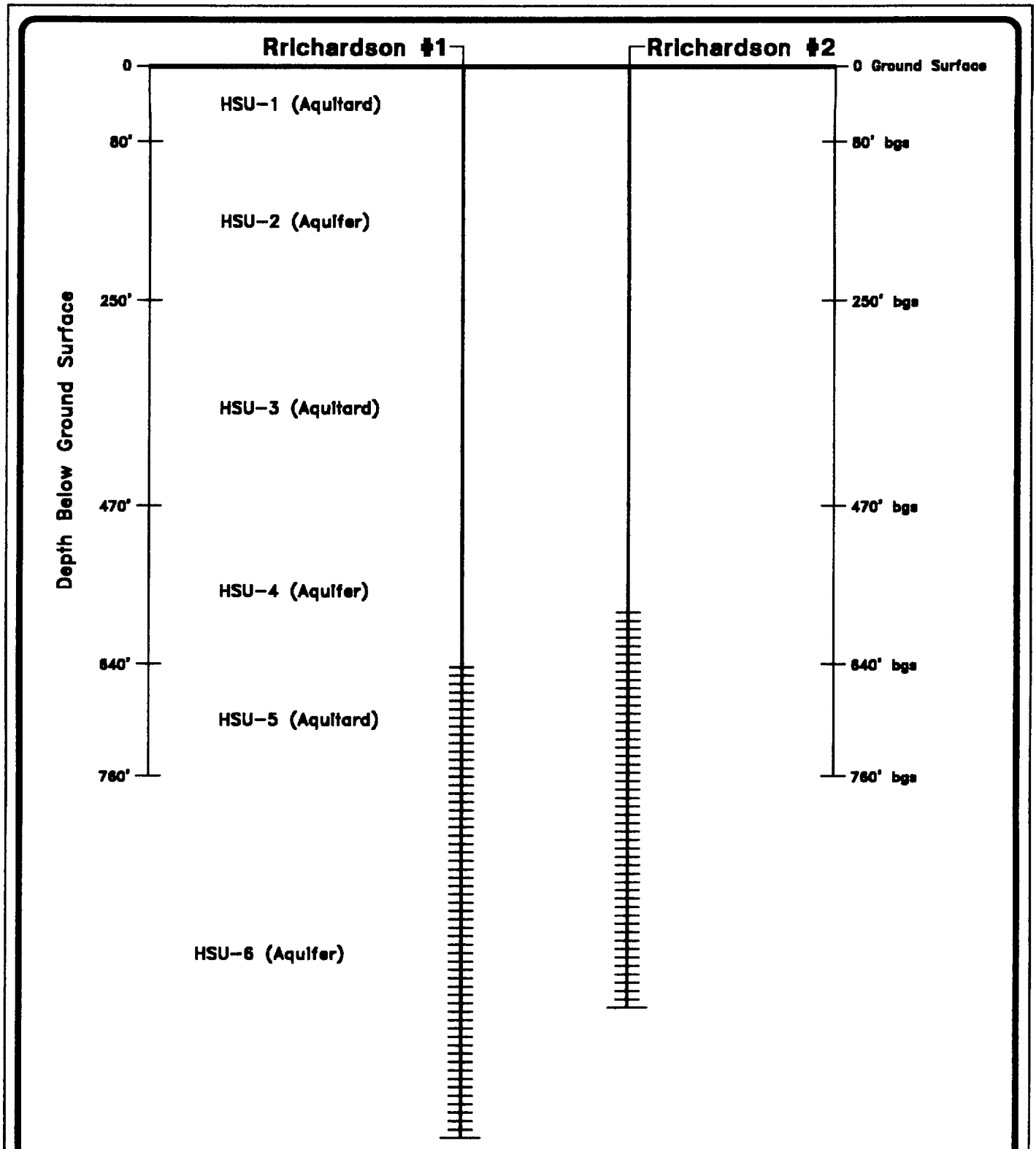
The results of the Richardson #2 attenuation test are not surprising given the perchlorate distribution in the aquifer system (described earlier) and the design of the well itself. Richardson #2 production well has screened intervals within the lowest 60 feet of HSU-4, all of HSU-5, and the upper 170 feet of HSU-6 (Figure B-1 shows the depths and screened intervals of the wells). Given this well design, it is expected that the highest perchlorate concentrations in the discharge water just after pumping is started. During this early period of pumping, the well is deriving most of its water from the HSU-4 screened interval because it is marginally more permeable, and also because it is nearest to the pump intake. As pumping proceeds, the HSU-6 contribution to the well becomes greater. Ultimately, the uncontaminated groundwater entering the well bore through the 170 feet of well

screen in HSU-6 is mixing with and diluting the perchlorate-impacted water entering through the 60 feet of well screen in HSU-4. The perchlorate concentrations of approximately 5 to 7 μg/L, that are reached in the second day of pumping and remain there for the balance of the four-day test, are interpreted as representing this mixing balance.

This attenuation test data supports a blending plan which includes the continuous operation of Richardson #2. During the early period of pumping from shutdown when perchlorate concentrations may be above the PAL, Richardson #2 can be blended with other perchlorate-free water sources.

The continued operation of Richardson #2 is a vital component of the near-term water supply strategy to meet COLL water demand through the peak months of 1999. In addition, the continued pumping of Richardson #2 also prevents localized migration of perchlorate from HSU-4 into HSU-6. If Richardson #2 is shut down and Richardson #1 is pumping (Richardson #1 draws water primarily from HSU-6), an enhanced vertically downward gradient is established in the area. In response to this gradient, perchlorate contaminated groundwater would enter the Richardson #2 screened interval in HSU-4, migrate through the well bore, and flow out of the HSU-6 screened interval into the aquifer. When Richardson #2 is allowed to pump, this flow is captured by inflow to Richardson #2, diluted with clean water from HSU-6, and discharged. HSU-6 is the only remaining source of clean water in this portion of the basin. The water systems should be operated in such a way as to protect it from degradation.

This mechanism also explains why perchlorate has recently been detected in Richardson #1. When Richardson #2 is not pumping, the perchlorate contaminated groundwater migrating through the Richardson #2 well bore and into HSU-6 is captured by Richardson #1 pumping, resulting in perchlorate detections. These conditions existed during the monthly sampling of Richardson #1 conducted in January (7.3 ppb), February (11 ppb), April (9.6 ppb) and May (12 ppb) of this year. However, during the attenuation test, which was conducted from February 24 to February 27, 1999, as well as during the monthly sampling of Richardson #1 conducted on March 1, 1999, Richardson #2 was pumping and no perchlorate was detected in Richardson #1. It is clear that the perchlorate detections in samples from Richardson #1 do not represent conditions in HSU-6, but rather are due to cross-contamination from HSU-4 as a result of Richardson #2 inactivity.



0 150' 300'

SCALE IN FEET

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TITLE: Simplefied Representation of Hydrostratigraphic Units and Richardson #1 and #2 Well Construction

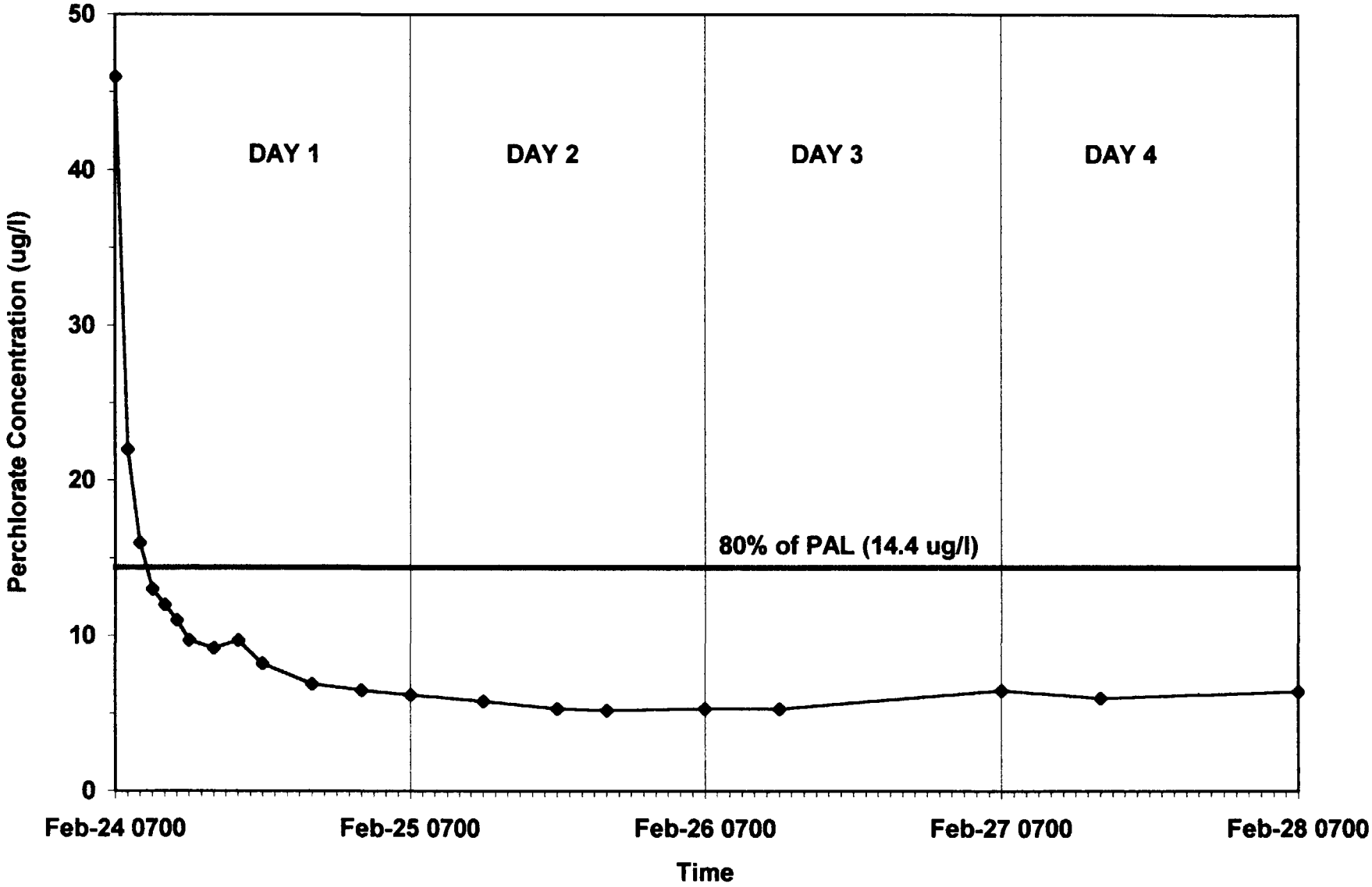
LOCATION: LOCKHEED MARTIN
LOMA LINDA, CALIFORNIA

HSI GEOTRANS
A TETRA TECH COMPANY

CHECKED:	Roy Marroquin
DRAFTED:	Hector Magaña
PROJ.:	C598-101
DATE:	05/28/99

FIGURE: B-1

Figure B-2
Richardson#2 Time-Series Attenuation Data



	2/24/99	2/25/99	2/26/99	2/27/99
Richardson#1	ND(4)	ND(4)	ND(4)	ND(4)
Richardson Blend	7.1	ND(4)	ND(4)	ND(4)
Richardson Home	ND(4)	ND(4)	ND(4)	ND(4)

p:\r..\l..\coll TSAttenuation.xls (Chart1)